SHOUT
SHARE
IT

[illegible]

O. 72. A. a
B

11

CATALOGUE

OF THE

FISHES

IN THE

BRITISH MUSEUM.

BY

ALBERT GÜNTHER,
M.A., M.D., PH.D., F.R.S., F.Z.S., ETC. ETC.

VOLUME EIGHTH.

BRITISH MUSEUM
Z D
NATURAL HISTORY

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1870.

71.
12 - 20.
3.

CATALOGUE

OF THE

PHYSOSTOMI,

CONTAINING THE FAMILIES

GYMNOTIDÆ, SYMBRANCHIDÆ, MURÆNIDÆ, PEGASIDÆ,

AND OF THE

LOPHOBRANCHII, PLECTOGNATHI,
DIPNOI, GANOIDEI, CHONDROPTERYGII,
CYCLOSTOMATA, LEPTOCARDII,

IN THE

BRITISH MUSEUM.

BY

DR. ALBERT GÜNTHER.

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1870.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

PREFACE.

Dr. Günther observes, "This volume concludes the Catalogue of Fishes. Most of the Collections whence the specimens therein described have been obtained are mentioned in the preceding volumes, so that I have to refer to the following only:—

"1. Typical specimens of East-Indian Murænoids, Lophobranchs, Plectognaths, and Plagiostomes described by Dr. Bleeker.

"2. Several collections from the Seychelle Islands made by Lieut.-Col. Playfair, Swinburne Ward, Esq., and Prof. E. Perceval Wright.

"3. Several collections made at St. Helena by J. C. Melliss, Esq.

"4. Several collections of freshwater and marine species from Algiers, made by Lieut.-Col. Playfair, H.M. Consul-General at Algiers.

"5. Typical specimens of the Sharks from the coast of Portugal, described and presented by Dr. B. du Bocage, Director of the Lisbon Museum.

"6. A Collection of Marine Fishes from Tasmania. Purchased.

"7. Several desiderata, presented by Prof. Kölliker.

"At the conclusion of this work I think it right to add a few remarks on the extent of our ichthyological knowledge generally, and on the present state of the Collection in the British Museum especially.

"It is of some interest to learn how many species of Fishes are known to exist. In the attempt to give an estimate I can only approach the truth, as in numerous cases it is impossible to decide from imperfect accounts whether an author has described a distinct species or one previously known. Again, the views of ichthyologists on species diverge so much that one will give a number several times as great as another*. I consider a species to be well established only when it is founded on characters which, from an examination of numerous examples, are found to be permanent, not subject to *gradual* variation, and not dependent on season, sex, or age—or which are known to be so from the examination of allied forms. A character of this kind is in general constantly accompanied by another, which would appear to be insignificant by itself. By this principle I have been guided throughout the work, and in naming the species of the Collection of the Museum; and this should be borne in mind in comparing the numbers of species given by me with the estimates prepared by other naturalists.

"In the present work 6843 species are regarded as well established and described, whilst 1682 others are doubtful and referred to by name only. Assuming, then, that about one half of the latter will be ultimately admitted into the system, and that, since the publication of the volumes of this work, about 1000 species have been described elsewhere, *we may put the total number of fishes known at present as about* 9000.

"At the respective dates of the preparation of the eight volumes of the present work 4219 species were available for autoptical examination. To these were afterwards added 958 species which were received too late for insertion; *so that the Collection of the British*

---

* "Prof. Agassiz states, in Sillim. Amer. Journ. 1854, xvii. p. 360, that he knows at least 20 North-American species of *Lepidosteus*; I can distinguish three or four only. In Prof. Kaup's 'Catalogue of Apodal Fishes' the two European Eels admitted by me are split into 20 species. Prof. Duméril, finally, has published the names of some 80 Sturgeons distinguished by him (Nouv. Arch. Mus. d'Hist. Nat. iii. 1867); I cannot recognize more than twenty. Such nominal species rarely survive their author; but, before they are merged again in the synonymy, they are the cause of much unnecessary trouble, and, being founded on slight individual peculiarities, they are frequently mistaken, rarely recognized."

Museum contains at the present time altogether 5177 *species, represented by* 29,275 *examples**.

"Rich as this Collection is in the possession of rare and frequently unique types, and however well merited its claim to take the first rank among ichthyological collections, it must be admitted that, containing not two-thirds of the known species, and on an average scarcely six examples of each species, it is capable of considerable enlargement and improvement. A species to which no particular interest is attached ought to be represented by at least three specimens, as a certain number of examples are necessary to fix specific characters. But there are a number of other fishes which cannot be perfectly understood without a much greater number of examples. Such are those which undergo with age changes so considerable that the stages of development have been described as different genera, or those which exhibit most extraordinary sexual differences, or are so subject to variation as to have given rise to the creation of numerous nominal species, or those which have a wide geographical distribution. Take, for instance, the Herring. Numerous as the specimens are in the Collection, they only exemplify the various stages of growth of the Herring of the south coast of England and of the Firth of Forth; they offer evidence as regards the truth or imperfection of the accounts left to us by Yarrell and Parnell; they indicate that the Herring attains somewhere (probably in the north) to the size of a large Mackerel (15 inches), whilst it exists in a degenerated condition in the Baltic; they also give us the means of showing the identity of the English Herring with that of North-Eastern America. But there are no specimens exemplifying the various kinds distinguished by professional herring-fishers, none to show the extent of its distribution towards the north or south,

---

* "The species and examples are distributed among the eight volumes thus:—

	Specimens		Species	
Vol.	enumerated.	since added.	in Brit. Mus.	since added.
I. (1859)	2508	1779	475	211
II. (1860)	3178	1269	531	198
III. (1861)	2625	1051	536	133
IV. (1862)	2877	1119	651	174
V. (1864)	1811	535	492	151
VI. (1866)	2173	278	268	34
VII. (1868)	3328	283	583	57
VIII. (1870)	4461	0	683	0"

none from the North Pacific or from the Arctic regions of either hemisphere, where we know that a Herring exists equally useful and perhaps identical with the European species. Thus, for the illustration of a single species, we may require a hundred specimens; and not one of them will be superfluous. Again, we know, at present, that at least some 140 different species of Sharks exist, a group of fishes which has always claimed a full share of attention in a seafaring nation, the oil and fins of which form a valuable article of trade, which, finally, from a scientific point of view, are those of all living fishes in which the palæontologist takes the greatest interest. Yet, with the imperfect state of all collections of Sharks and Rays, our knowledge of them remains equally incomplete. Being compelled to limit, in most cases, our examinations to the fœtus or to examples not far removed from that stage, or to parts of old individuals which can be determined in a general manner only, we cannot follow the changes which their dentition undergoes with age; and the palæontologist, who chiefly depends on this character, is unable to connect and interpret his fragmentary materials satisfactorily, unless supplied by the zoologist with the information which is accessible to the latter only. This information cannot be obtained without a collection requiring much space. Some Sharks exceed a length of 30 feet; and it is no exaggeration to ascribe an average length of 5 feet to each of the 140 species known.

"After having pointed out imperfections of the collection as they are apparent with regard to the present state of science, I have to urge the necessity of keeping pace with the rapid progress of ichthyology resulting from the efforts in other countries. Since the period marked by the publication of the Ichthyology of the 'Beagle,' 'Erebus and Terror,' 'Sulphur,' and 'Samarang,' the National Collection has been left entirely to its own resources, and has been dependent on the booty of private collectors. One of the chief sources, the navy, which assisted Sir J. Richardson in bringing together the magnificent collection at Haslar Hospital, now transferred to the British Museum, has failed entirely* since the great

---

* "With the exception of the Magellan-Straits Expedition, to which Dr. Cunningham was attached as naturalist. This gentleman made considerable collections, part of which were deposited in the British Museum. The number of specimens of fishes obtained from this source is 78."

English ichthyologist withdrew from active life. Meanwhile the expeditions fitted out by Austria and Prussia, each accompanied by a staff of naturalists, brought large collections of fishes to the Berlin and Vienna Museums; in St. Petersburg collections made in North-eastern Asia are accumulating; Dr. Bleeker, who has made us acquainted with the astonishing variety of fishes in the East-Indian archipelago, could not have succeeded so well without the cordial cooperation of the officials residing in the various islands; Messrs. Godeffroy, wealthy merchants of Hamburgh, have founded, merely by the assistance of the captains of their own ships and of two or three collectors, a private museum which supplies now annually other public collections with a great number of rare or quite new forms from the various parts of the Pacific; in the United States each exploring expedition was and still is accompanied by naturalist collectors, employed solely for the benefit of public museums; and, finally, Prof. Agassiz himself has explored the ichthyology of the River Amazons, and returned with a booty the richness of which is great, though not yet exactly defined.

"Thus there cannot be any doubt with regard to the activity put forth in the field of ichthyology; and it is a fact that the foremost men in science have devoted a great proportion of their researches to this branch,—and justly so. No other class of vertebrates offers a similar gradation of development of the most important systems and organs, rendering its systematic arrangement one of the most difficult problems of zoology. Infinite are those modifications of organs which may be brought into connexion with the variations of their mode of life and with the widely different physical conditions under which fishes live. There is no fresh water, no sea, no part of the sea which is not inhabited by fishes, some kinds being restricted to an insignificant pool, whilst others roam over the whole extent of the various oceans, or are organized to exist under the pressure of great depths, the same species living in the Atlantic, North Pacific, and Antarctic. The freshwater forms being limited to the river- or lake-systems which they inhabit, and being less exposed to the disturbances affecting the terrestrial animals, are singularly adapted for the elucidation of the original geographical distribution of the animals of the present creation. No other class of the vertebrates is of equal importance to the geologist and palæontologist, the materials for comparing the living with past creations being so numerous and diversified that we cannot help thinking that the question of the relations of the various epochs to one another will be solved in the field of ichthyology. Although fishes are mostly hidden by the element in which they live, so that the knife of the anatomist generally first reveals new facts connected with their life, we have sufficient evidence to show that the phenomena of life are more varied in their different groups than in any of the higher Vertebrata, and that their study will form a solid basis for the solution of those general biological questions which, perhaps rather prematurely, agitate the minds of many zoologists.

"An interest in Ichthyology is generally diffused in England; but its study is much neglected. Nor could it be otherwise. Where is it taught? Of the teachers of zoology in the numerous German, Scandinavian, Russian, Italian, and Portuguese universities, there is scarcely one who has not been an author in Ichthyology; and consequently he takes care that this branch shall not be neglected in his course of lectures. In Paris there exists a separate chair for Ichthyology and Herpetology. In the United States Ichthyology is taught by the author of the 'Recherches sur les Poissons Fossiles' and his pupils. In England I have met with many struggling hard to obtain ichthyological knowledge, with not one who was assisted in it by a teacher.

"Of course this state of things is in immediate connexion with the defective system of scientific education; but it must appear very anomalous indeed when we consider that the public of the mother country, as well as of the colonies, have the liveliest interest in ichthyology, as is proved by the daily requests for information, sometimes accompanied by collections made at considerable personal sacrifice, expressly with the object of diffusing scientific knowledge and of increasing the resources derived from this class of animals.

"Finally, it may be asked in what way ichthyology has been advanced by the publication of the present work? In the first place, then, the entire collection in the British Museum has been named, arranged, and described, so that, with the assistance of the Catalogue, every species and every individual specimen may be as easily found as a book in a well-arranged library, and has been rendered accessible to students and foreign visitors. Nearly 800 species have been regarded as new, many of them types of distinct genera. But it would have been a work rather of local interest if it had been confined to the objects in the British Museum; besides, to determine species satisfactorily, a general study of all the allied species is necessary. Therefore its scope was extended to describing also those species which at present are not represented in the British Museum. In this form (that of a Handbook containing descriptions of, or references to, all the species known) it promised to be particularly useful to the student of ichthyology, the traveller, and collector. The last general works were that of Lacépède and Schneider's edition of Bloch, published at the beginning of this century, and containing between 1400 and 1500 species, of which about 1100 are still recognized. The great work by Cuvier and Valenciennes remained incomplete.

"The species and genera have been critically examined; and I have come to the conclusion, after the study of long series of examples, or after autoptical comparison of typical specimens, that it was necessary to eliminate from the system a great number of species, as well as genera, established on insufficient grounds. Zoological science is never advanced by general works compiled mechanically and without critical discernment. In the descriptions, I have been satisfied with giving the most important characters, without entering into a complete account of the organization, as this necessarily would have been, for the most part, merely a reproduction of the labours of others; these, however, are conscientiously referred to. But whenever I thought an observation made by me new and original I have added it. I have paid particular attention to the formation of more natural families, in which endeavour I have laid greater stress upon the structure of the vertical fins and of the skeleton as family characters than my predecessors. Still thinking that the subclasses proposed by Müller are most expressive of the fundamental differences in the organization of fishes, I found myself compelled, on the other hand, to abandon the order of Pharyngognaths, on establishing which he had bestowed so much labour.

"I am well aware of the many imperfections of this work; many have been already corrected by others; but if it should form the basis for the future development of a collection at present unrivalled

—if it should assist my fellow labourers and enlist others—if it should contribute to the advancement of truth, I shall not repent having devoted the best years of my life to its execution. During all this time I have had the great advantage of the assistance and experience of Mr. Edward Gerrard, to whom is due the excellent state in which I found the collection, and who has relieved me from the work connected with its registration and preservation. If circumstances permit, the numerous recent additions to the collection and to the literature generally, with a general Index, will be embodied in a supplementary volume. It may also be hoped that the illustrations alluded to in the first volume will soon be added."

JOHN EDWARD GRAY.

British Museum,
May 20, 1870.

SYSTEMATIC INDEX.

Subclass I. TELEOSTEI (*continued*).

Order IV. PHYSOSTOMI (*continued*).

Fam. 26. Gymnotidæ.

Page
1. Sternarchus, *Cuv.* 2

α. Sternarchus.

1. albifrons, *L.* 2
2. brasiliensis, *Rnhrdt.* 3
3. nattereri, *Steindachner* .. 3
4. schotti, *Steindachner* ... 3
5. bonapartii, *Casteln.* 3

β. Rhamphosternarchus.

6. oxyrhynchus, *M. & T.* .. 4
7. macrostoma, *Gthr.* 4
8. mormyrus, *Steindachner* 4
2. Rhamphichthys, *M. & T.* .. 4

a. Rhamphichthys.

1. rostratus, *L.* 5
2. blochii, *Kaup* 5
3. pantherinus, *Casteln.* ... 5

β. Brachyrhamphichthys.

4. artedii, *Kaup* 6
5. mülleri, *Kaup* 6
6. brevirostris, *Steindachner* 6
3. Sternopygus, *M. & T.* 7
1. carapus, *L.* 7
2. virescens, *Val.* 7
3. axillaris, *Gthr.* 8
4. troschelii, *Kaup* 8
æquilabiatus, *Humboldt* 7
4. Carapus, *M. & T.* 8
1. fasciatus, *Pall.* 9
5. Gymnotus, *Cuv.* 10
1. electricus, *L.* 10

Fam. 27. Symbranchidæ.

First Group. Amphipnoina.

1. Amphipnous, *Müll.* 13
1. cuchia, *Ham. B.* 13

Second Group.
Symbranchina.

Page
2. Monopterus, *Lacép.* 14
1. javanensis, *Lacép.* 14
3. Symbranchus, *Bl.* 15
1. marmoratus, *Bl.* 15, 515
2. bengalensis, *M'Clell.* .. 16
3. caligans, *Caut.* 17

Third Group.
Chilobranchina.

4. Chilobranchus, *Rich.* 17
1. dorsalis, *Rich.* 18

Fam. 28. Murænidæ.

Murænidæ Platyschistæ.

First Group. Nemichthyina.

1. Nemichthys, *Rich.* 21
1. scolopacea, *Rich.* 21

Second Group.
Saccopharyngina.

2. Saccopharynx, *Mitch.* 22
1. flagellum, *Mitch.* 22

Third Group.
Synaphobranchina.

3. Synaphobranchus, *Johns.* .. 22
1. pinnatus, *Gronov.* 23

Fourth Group. Anguillina.

4. Anguilla, *Cuv.* 23
1. mauritiana, *Benn.* 25
2. labiata, *Ptrs.* 26
3. fidjiensis, *Gthr.* 26
4. bengalensis, *Gray* 27
5. reinhardtii, *Steindachner* 27
6. macrophthalma, *Ptrs.* .. 28
7. mossambica, *Ptrs.* 28
8. vulgaris, *Flem.* 29
9. bostoniensis, *Les.* 31
10. texana, *Kaup* 32
11. latirostris, *Risso* 32

Page
12. aucklandii, *Rich.* 33
13. delalandii, *Kaup* 33
14. aneitensis, *Gthr.* 34
15. amboinensis, *Ptrs.* 34
16. megastoma, *Kaup* 34
17. kieneri, *Kaup* 35
18. bicolor, *M'Clell.* 35
19. virescens, *Ptrs.* 35
20. sidat, *Blkr.* 36
malabarica, *Kaup* 36
21. australis, *Rich.* 36
22. amblodon, *Gthr.* 37
23. dussumierii, *Kaup* 37
eurystoma, *Heck. & Kner* 23
serpentina, *Les.* 23
avisotis, *Rich.* 23
clathrata, *Rich.* 23
fasciata, *Kaup* 23
macrops, *Kaup* 23
angustidens, *Kaup* 23
eurylæma, *Kaup* 23
halmaherensis, *Blkr.* 23
cantori, *Kaup* 23
macrocephala, *Rapp* 23
marmorata, *Q. et G.* 24
otaheitensis, *Kaup* 24
capensis, *Kaup* 24
5. Conger, *Kaup* 37
1. marginatus, *Val.* 38
2. vulgaris, *Cuv.* 39
esculentus, *Poey* 39
3. multidens, *Casteln.* 40
4. macrops, *Gthr.* 40
Echelus caudolimbatus, *Poey* 40
orbignyanus, *Val.* 37
fasciatus, *Rich.* 37
rubescens, *Ranzani* 37
6. Congromuræna, *Kaup.* 40
1. balearica, *De la Roche* 41
analis, *Poey* 41
2. punctus, *Jen.* 41
3. anago, *Schleg.* 42
4. mellissii, *Gthr.* 42
5. habenata, *Rich.* 42
neoguinaicus, *Blkr.* 43
Myrophis heterognathus, *Blkr.* 43
6. mystax, *De la Roche* 43
myriaster, *Brevoort* 40
7. Uroconger, *Kaup* 43
1. lepturus, *Rich.* 44

Fifth Group.
HETEROCONGRINA.

8. Heteroconger, *Blkr.* 44
1. polyzona, *Blkr.* 44
Page
2. longissimus, *Gthr.* 45

Sixth Group.
MURÆNESOCINA.

9. Muræenesox, *M'Clell.* 45
1. talabon, *Cuv.* 45
2. talabonoides, *Blkr.* 46
3. cinereus, *Forsk.* 46
4. savanna, *Cuv.* 47
10. Nettastoma, *Raf.* 48
1. melanurum, *Raf.* 48
11. Saurenchelys, *Ptrs.* 48
1. cancrivora, *Ptrs.* 48
12. Oxyconger, *Blkr.* 48
1. leptognathus, *Blkr.* 49
13. Hoplunnis, *Kaup* 49
1. schmidtii, *Kaup* 49
14. Neoconger, *Girard* 49
1. mucronatus, *Girard* 49

Seventh Group. MYRINA.

15. Myrus, *Kaup* 49
1. vulgaris, *Kaup* 50
2. uropterus, *Schleg.* 50
16. Myrophis, *Lütken* 50
1. punctatus, *Lütken* 50, 515
microstigmius, *Poey* 51
17. Paramyrus, *Gthr.* 51
1. cylindroideus, *Ranzani* 51
2. microchir, *Blkr.* 51
18. Chilorhinus, *Lütken* 51
1. suensonii, *Lütken* 52
19. Murænichthys, *Blkr.* 52
1. macropterus, *Blkr.* 52
2. gymnopterus, *Blkr.* 52
3. schultzii, *Blkr.* 52
4. gymnotus, *Blkr.* 53
5. moorii, *Gthr.* 53
6. vermiformis, *Ptrs.* 53
7. macrostomus, *Blkr.* 53

Eighth Group.
OPHICHTHYINA.

20. Liuranus, *Blkr.* 54
1. semicinctus, *Benn.* 54
21. Ophichthys, *Gthr.* 55
1. rostellatus, *Rich.* 56
2. punctifer, *Kaup* 56
3. adspersus, *Gthr.* 56
4. intertinctus, *Rich.* 56
5. triserialis, *Kaup* 57
6. grandimaculata, *K. & St.* 58
7. parilis, *Rich.* 59
8. dicellurus, *Rich.* 59
9. magnoculus, *Kaup* 59
10. gomesii, *Casteln.* 60
chrysops, *Poey* 60

Page
11. pauciporus, *Poey* 60
12. puncticeps, *Kaup* 60
13. hyala, *H. B.* 60
14. pallens, *Rich.* 61
15. broekmeyeri, *Blkr.* 61
16. rhytidodermatoides, *Blkr.* 62
17. rhytidoderma, *Blkr.* .. 63
18. maclellandi, *Blkr.* 63
19. marginatus, *Ptrs.* 64
20. crocodilinus, *Benn.* 64
Achirophichthys typus, *Br.* 65
21. cirrochilus, *Blkr.* 65
22. serpens, *L.* 65
23. regius, *Rich.* 66
24. ornatissimus, *Kaup* 67
25. havannensis, *Bl. Schn.* 67
26. versicolor, *Rich.* 68
27. ocellatus, *Les.* 68
28. ater, *Ptrs.* 68
29. bonapartii, *Kaup* 69
30. cephalozona, *Blkr.* 69
31. apicalis, *Benn.* 70
32. grandoculis, *Cant.* 71
33. bernsteinii, *Blkr.* 71
34. singapurensis, *Blkr.* .. 71
35. macrochir, *Blkr.* 72
36. hispanus, *Bellotti* 72
37. remicaudus, *Kaup* 73
38. brasiliensis, *Kaup* 73
39. urolophus, *Schleg.* 73
40. polyophthalmus, *Blkr.* 73
41. altipinnis, *Kaup* 74
42. calamus, *Gthr.* 74
43. chinensis, *Kaup* 75
44. tapeinopterus, *Blkr.* .. 75
45. chilopogon, *Blkr.* 76
46. playfairii, *Gthr.* 76
47. pacifici, *Gthr.* 76
48. boro, *H. B.* 77
49. cancrivorus, *Rich.* 78
50. hoevenii, *Blkr.* 79
51. hypselopterus, *Blkr.* .. 79
52. semicinctus, *Rich.* 80
53. dromicus, *Gthr.* 80
54. colubrinus, *Boddaert* .. 81
55. maculosus, *Cuv.* 81
56. breviceps, *Rich.* 82
57. pardalis, *Val.* 82
58. quincunciatus, *Gthr.* .. 83
59. acuminatus, *Gronov.* .. 83
60. imberbis, *De la Roche* .. 84
61. anceps, *Cant.* 84
62. moluccensis, *Blkr.* 85
63. fuscus, *Zuiew* 85
64. macrodon, *Blkr.* 85
65. polyophthalmus, *Blkr.* 85
66. kaupi, *Blkr.* 86
Page
67. bicolor, *Kaup* 86
68. timorensis, *Gthr.* 86
69. orientalis, *M'Clell.* 87
70. melanotænia, *Blkr.* 87
71. marmoratus, *Blkr.* 88
guichenoti, *Kaup* 88
72. longipinnis, *Kner & St.* 88
73. tenuis, *Gthr.* 88
74. kirkii, *Gthr.* 89
75. quadratus, *Rich.* 89
76. cæcus, *L.* 89
77. gracilis, *Kaup* 90
78. acutirostris, *Barnev.* .. 90
brachyurus, *Poey* 55
magnifica, *Abbott* 55
californiensis, *Garrett* .. 55
rostratus, *Bl.* 55
cephalopeltis, *Blkr.* 55

Ninth Group.
PTYOBRANCHINA.

22. Moringua, *Gray* 90
1. raitaborua, *H. B.* 90
2. lumbricoidea, *Rich.* 91
3. bicolor, *Kaup* 91
4. javanica, *Kaup* 92
5. abbreviata, *Blkr.* 92
6. macrocephala, *Blkr.* .. 92

MURÆNIDÆ ENGYSCHISTÆ.

Tenth Group. MURÆNINA.

23. Myroconger, *Gthr.* 93
1. compressus, *Gthr.* 93
24. Muræna, *Gthr.* 93
1. helena, *L.* 96
2. augusti, *Kaup* 97
3. melanotis, *Kaup* 98
4. pavonina, *Rich.* 98
5. pardalis, *Schleg.* 99
6. lentiginosa, *Jen.* 99
7. meleagris, *Shaw* 100
8. miliaris, *Kaup* 100
9. flavopicta, *Kaup* 101
elaborata, *Poey* 101
10. stellifera, *Rich.* 101
margaritophorus, *Blkr.* 101
11. punctata, *Bl. Schn.* 102
12. conspersa, *Poey* 102
13. ocellata, *Agass.* 102
14. dovii, *Gthr.* 103
15. nudivomer, *Gthr.* 104
16. rüppellii, *M'Clell.* 104
17. petelli, *Blkr.* 105
18. reticularis, *Bl.* 105
19. punctato-fasciata, *Blkr.* 106
20. tessellata, *Rich.* 106

Page
21. reevesii, *Rich.* 107
22. tigrina, *Rüpp.* 108
23. fimbriata, *Benn.* 108
24. microspila, *Gthr.* 109
25. melanospila, *Blkr.* 109
26. polyophthalmus, *Blkr.* .. 109
27. undulata, *Lacép.* 110
blochii, *Blkr.* 111
28. macassariensis, *Blkr.* .. 111
29. formosa, *Blkr.* 111
30. pseudothyrsoidea, *Blkr.* 112
31. tile, *H. B.* 112
32. thyrsoidea, *Rich.* 113
33. buroënsis, *Blkr.* 114
34. polyuranodon, *Blkr.* 114
35. duivenbodii, *Blkr.* 114
36. anatina, *Lowe* 115
37. sanctæ helenæ, *Gthr.* .. 115
38. irregularis, *Kaup* 115
39. picta, *Ahl.* 116
40. nubila, *Rich.* 117
mülleri, *Kaup* 117
41. sagenodeta, *Rich.* 117
42. richardsoni, *Blkr.* 118
43. tenebrosa, *Rich.* 119
44. marmorea, *Val.* 119
45. flavomarginata, *Rüpp.* .. 119
46. moringa, *Cuv.* 120
47. vicina, *Casteln.* 121
48. callorhyncha, *Gthr.* 122
49. hepatica, *Rüpp.* 122
50. euptera, *Gthr.* 122
51. cinerascens, *Rüpp.* 123
52. afra, *Bl.* 123
53. aterrima, *Kaup* 124
54. maculipinnis, *Kaup* 124
55. unicolor, *De la Roche* .. 125
56. maderensis, *Johns.* 125
57. sanguinea, *Poey* 126
58. moluccensis, *Blkr.* 126
59. modesta, *Kaup* 126
60. sathete, *H. B.* 126
61. schismatorhynchus, *Blkr.* 127
62. acutirostris, *Abbott* 127
63. macrurus, *Blkr.* 127
64. brummeri, *Blkr.* 128
65. polyodon, *Blkr.* 128
66. zebra, *Shaw* 128
67. polyzona, *Rich.* 129
68. nebulosa, *Ahl.* 130
69. catenata, *Bl.* 130
70. xanthospila, *Blkr.* 131
71. lecomtii, *Kaup* 131
72. pelii, *Kaup* 132
73. fascigula, *Ptrs.* 132
74. amblyodon, *Blkr.* 132
75. rhodochilus, *Blkr.* 132

Page
76. auloptera, *De Filippi* .. 132
wilsoni, *Bl. Schn.* 93
stellata, *Lacép.* 93
haüy, *Lacép.* 94
fulva, *Risso* 94
marmorata, *Q. & G.* 94
lineata, *Less.* 94
flaveola, *Less.* 94
cerino-nigra, *Rich.* 94
blochii, *Kaup* 94
micropœcilus, *Blkr.* 94
mauritiana, *Kaup* 94
nigrolineata, *Kaup* 94
flavimarginata, *Kaup* .. 94
chrysops, *Kaup* 94
multiocellata, *Poey* 94
erebus, *Poey* 94
appendiculata, *Guichen.* . 94
porphyreus, *Guichen.* .. 94
kaupii, *Abbott* 94
eurosta, *Abbott* 94
concolor, *Abbott* 94
scriptus, *Bl. Schn.* 94
canina, *Q. & G.* 94
mordax, *Ayres* 94
25. Gymnomuræna, *Blkr.* 133
1. tigrina, *Less.* 133
2. marmorata, *Lacép.* 133
3. concolor, *Rüpp.* 134
4. fusca, *Ptrs.* 134
5. vittata, *Rich.* 134
6. bennettii, *Gthr.* 135
26. Enchelycore, *Kaup* 135
1. nigricans, *Bonnat.* 135
bleekeri, *Kaup* 136

Leptocephalus, *Gronov.* .. 136
Hyoprorus, *Kölliker* 144
Tilurus, *Kölliker* 144
Stomiasunculus, *Kaup* 145
Esunculus, *Kaup* 145
Porobronchus, *Kaup* 145
Prymnothonus, *Rich.* 145

Fam. 29. PEGASIDÆ.

1. Pegasus, *L.* 147
1. draconis, *L.* 147
2. volans, *L.* 148
3. natans, *L.* 148
4. lancifer, *Kaup* 149

Order V. LOPHOBRANCHII.

Fam. 1. SOLENOSTOMIDÆ.

1. Solenostoma, *Lacép.* 151
1. cyanopterum, *Blkr.* 151
2. paradoxum, *Pall.* 152
3. brachyurum, *Blkr.* 152

Fam. 2. SYNGNATHIDÆ. Page

First Group. SYNGNATHINA.

1. Siphonostoma, *Kaup* 154
    1. typhle, *L.* 154, 515
    2. rotundatum, *Michah.* .. 155
2. Syngnathus, *auct.* 155
    1. phlegon, *Risso* 156
    2. peckianus, *Storer* 157
    3. acus, *L.* 157, 515
    4. louisianæ, *Gthr.* 160
    5. schlegelii, *Kaup* 160
    6. griseolineatus, *Ayres* .. 160
    7. acicularis, *Jen.* 161
    8. fistulatus, *Ptrs.* 161
    9. alternans, *Gthr.* 162
    10. semifasciatus, *Gthr.* 162
    11. blainvillianus, *Eyd. & G.* 162
    12. affinis, *Gthr.* 163
    13. rousseaui, *Kaup* 163
    14. abaster, *Risso* 164, 515
    15. algeriensis, *Playf.* 164
    16. agassizii, *Michah.* 164
    17. temminckii, *Kaup* 165
    18. dimidiatus, *Gill* 165
    19. pelagicus, *Osbeck* 165
    20. modestus, *Gthr.* 166
    21. crinitus, *Jen.* 166
    22. brevirostris, *Rüpp.* 167
    23. serratus, *Schleg.* 167
    24. longirostris, *Kaup* 167
    25. intermedius, *Kaup* 168
    26. ceylonensis, *Gthr.* 168
    27. zanzibarensis, *Gthr.* 168
    28. grayi, *Kaup* 169
    29. tetrophthalmus, *Blkr.* .. 169
    30. albirostris, *Kaup* 170
    31. cyanospilus, *Blkr.* 170
    32. margaritifer, *Ptrs.* 171
    33. penicillus, *Cant.* 171
    34. tapeinosoma, *Blkr.* 172
    35. hunnii, *Blkr.* 172
    36. spicifer, *Rüpp.* 172
        heptagonus, *Blkr.* 173
    37. kaupi, *Blkr.* 174
    38. pœcilolæmus, *Ptrs.* 174
    39. conspicillatus, *Jen.* 174
    40. martensii, *Ptrs.* 175
    41. flavescens, *Kaup* 175
    42. retzii, *Blkr.* 175
    43. bicoarctatus, *Blkr.* 176
    44. budi, *Blkr.* 176
        brachyrhynchus, *Kaup* 155
        sundaicus, *Blkr.* 155
        vittatus, *Kaup* 155
        fucicola, *Benn.* 155
        flavofasciatus, *Rüpp.* .. 156
        punctipinnis, *Gill* 156
        tenuis, *Blyth* 156
        brachycephalus, *Poey* .. 156
        tenuis, *Poey* 156
3. Ichthyocampus, *Kaup* 176
    1. carce, *H. B.* 176
    2. belcheri, *Kaup* 177
    3. scalaris, *Gthr.* 177
    4. filum, *Gthr.* 178
4. Nannocampus, *Gthr.* 178
    1. subosseus, *Gthr.* 178
5. Urocampus, *Gthr.* 179
    1. nanus, *Gthr.* 179
6. Doryichthys, *Gthr.* 179
    1. heterosoma, *Blkr.* 180
    2. boaja, *Blkr.* 180
    3. deokhatoides, *Blkr.* 180
    4. bilineatus, *Kaup* 181
    5. mento, *Blkr.* 181
    6. cuncalus, *H. B.* 181
    7. caudatus, *Ptrs.* 182
    8. bleekeri, *Day* 182
    9. auronitens, *Kaup* 182
        bernsteinii, *Blkr.* 183
    10. millepunctatus, *Kaup* .. 183
    11. lineatus, *Kaup* 183, 515
    12. brachyurus, *Blkr.* 184
    13. manadensis, *Blkr.* 184
    14. pleurostictus, *Ptrs.* 185
    15. dumerilii, *Kaup* 185
    16. sculptus, *Gthr.* 185
    17. dactylophorus, *Blkr.* .. 186
    18. californiensis, *Gill* 186
    19. excisus, *Kaup* 186
    20. valenciennii, *Kaup* 187
        pristipeltis, *Kaup* 179
        deocata, *H. B.* 179
        jagorii, *Ptrs.* 179
    Leptoichthys fistularius, *Kp.* 187
7. Cœlonotus, *Ptrs.* 188
    1. liaspis, *Blkr.* 188
    2. biocellatus, *Gthr.* 188
    3. argulus, *Ptrs.* 189
8. Stigmatophora, *Kaup* 189
    1. argus, *Rich.* 189
    2. nigra, *Kaup* 190
9. Nerophis, *Kaup* 190
    1. æquoreus, *L.* 191
    2. dumerilii, *Steindachner* 191
    3. ophidion, *L.* 192
    4. heckelii, *Kaup* 192
    5. papacinus, *Risso* 192
    6. teres, *Rathke* 193, 516
    7. lumbriciformis, *Yarr.* .. 193
        violaceus, *Risso* 190
        annulatus, *Risso* 190

Page
10. Protocampus, *Gthr.* 193
1. hymenolomus, *Rich.* 194

Second Group.
HIPPOCAMPINA.

11. Gastrotokeus, *Kaup* 194
1. biaculeatus, *Bl.* 194
12. Solenognathus, *Swainson* 195
1. hardwickii, *Gray* 195
2. spinosissimus, *Gthr.* 196
3. lettiensis, *Blkr.* 516
13. Phyllopteryx, *Swainson* 196
1. foliatus, *Shaw* 196
2. eques, *Gthr.* 197
3. tæniophorus, *Gray* 197
14. Acentronura, *Kaup* 198
1. gracillima, *Kaup* 198
2. tentaculata, *Gthr.* 516
15. Hippocampus, *Leach* 198
1. abdominalis, *Less.* 199
2. antiquorum, *Leach* 200
3. breviceps, *Ptrs.* 200
4. angustus, *Gthr.* 200
5. novæ hollandiæ, *Steind.* 201
6. ramulosus, *Leach* 201
7. longirostris, *Cuv.* 201
8. guttulatus, *Cuv.* 202
deanei, *Duméril* 203
9. trimaculatus, *Leach* 204
10. comes, *Cant.* 204
11. camelopardalis, *Bianc.* 205
12. coronatus, *Schleg.* 205
13. lævicaudatus, *Kaup* 205
14. bicuspis, *Kaup* 205
15. lichtensteinii, *Kaup* 205
16. mohnikei, *Blkr.* 206
17. hystrix, *Kaup* 206
18. erinaceus, *Gthr.* 206
algiricus, *Kaup* 198
marginalis, *Kaup* 198
fascicularis, *Kaup* 198
fuscus, *Rüpp.* 198
brevirostris, *Storer* 198
gracilis, *Gill* 198
ingens, *Girard* 198

Order VI. PLECTOGNATHI.

Fam. 1. SCLERODERMI.

First Group. TRIACANTHINA.

1. Triacanthodes, *Blkr.* 208
1. anomalus, *Schleg.* 208
2. Hollardia, *Poey* 209
1. hollardi, *Poey* 209
3. Triacanthus, *Cuv.* 209
1. brevirostris, *Schleg.* 209
Page
2. biaculeatus, *Bl.* 210
3. strigilifer, *Cant.* 211

Second Group. BALISTINA.

4. Balistes, *Cuv.* 211

a. *Liurus.*

1. stellatus, *Lacép.* 212

b. *Balistes.*

2. maculatus, *Gm.* 213, 516
3. aureolus, *Rich.* 215
4. vetula, *L.* 215
5. forcipatus, *Gm.* 216, 516
6. vidua, *Rich.* 216
7. capriscus, *Gm.* 217
8. niger, *Mungo Park* 218
9. mitis, *Benn.* 218, 517
10. bursa, *Bl. Schn.* 219
11. conspicillum, *Bl. Schn.* 220
12. viridescens, *Bl. Schn.* 220
13. ringens, *L.* 221
14. auromarginatus, *Benn.* 221
15. rivulatus, *Rüpp.* 222
16. fuscus, *Bl. Schn.* 222
17. flavimarginatus, *Rüpp.* 223, 517
18. aculeatus, *L.* 223
19. assasi, *Forsk.* 224
20. verrucosus, *L.* 225
21. rectangulus, *Bl. Schn.* 225
22. cinereus, *Bonnat.* 226
23. undulatus, *Mungo Park* 226
24. oiré, *Benn.* 227

c. *Melanichthys.*

25. buniva, *Lacép.* 227

d. *Erythrodon.*

26. erythrodon, *Gthr.* 228
jacksonianus, *Q. & G.* 211
gutturosus, *Hollard* 211
elongatus, *Hollard* 211
heteracanthus, *Blkr.* 211
tæniopterus, *Poey* 211
nebulosus, *Poey* 211
caprinus, *Val.* 211
lima, *Benn.* 211
5. Monacanthus, *Cuv.* 229

a. *Monacanthus.*

1. pardalis, *Rüpp.* 230
2. scopas, *Cuv.* 232
3. longirostris, *Cuv.* 233
4. cryptodon, *Blkr.* 233
5. curtorhynchus, *Blkr.* 234
6. prionurus, *Blkr.* 234
7. trossulus, *Rich.* 234
8. oculatus, *Gthr.* 235
baueri, *Rich.* 235
9. chinensis, *Bl.* 236
10. megalurus, *Rich.* 237
11. occidentalis, *Gthr.* 237

Page
12. tomentosus, *L.* 238
13. sulcatus, *Holl.* 239
14. setifer, *Benn.* 239
15. nematophorus, *Gthr.* .. 241
16. oblongus, *Schleg.* 241
17. chœrocephalus, *Blkr.* .. 242
nemurus, *Blkr.* 242
18. melanocephalus, *Blkr.*.. 242
19. spilosoma, *Benn.* 243
20. granulosus, *White* 243
21. rudis, *Rich.* 244
22. ayraudi, *Q. & G.* 244
23. penicilligerus, *Cuv.* 245
24. hippocrepis, *Q. & G.* .. 246
25. knerii, *Steindachner* 246
26. gunnii, *Gthr.* 247
27. macrurus, *Blkr.* 247
28. convexirostris, *Gthr.* .. 248
29. multiradiatus, *Gthr.* .. 248
30. trachylepis, *Gthr.* 248
31. peronii, *Holl.* 249
scaber, *Forst.* 249
32. brownii, *Rich.* 249
33. spilomelanurus, *Q. & G.* 250
b. *Aleuteres.*
34. heudelotii, *Holl.* 251
35. monoceros, *Osb.* 251
36. convexifrons, *Holl.* 252
37. scriptus, *Osb.* 252
liturosus, *Shaw* 253
38. personatus, *Less.* 253
39. aurantiacus, *Mitch.* 254
40. punctatus, *Agass.*...... 254
41. nasicornis, *Schleg.* 254
pusillus, *Rüpp.*........ 229
freycineti, *Cuv.*........ 229
broccus, *Mitch.*........ 229
maculosus, *Rich.* 229
brevispinosus, *Holl.*.... 229
freycineti, *Holl.* 229
platifrons, *Holl.* 229
serrasquamosus, *Holl.* .. 229
tricuspis, *Holl.*........ 229
dumerilii, *Holl.* 229
nitens, *Holl.*.......... 229
trachyderma, *Blkr.* 229
holbrookii, *Holl.* 229
cuspicauda, *Mitch.* 229
lineolatus, *Rich.* 229
6. Anacanthus, *Gray*........ 255
1. barbatus, *Gray*........ 255

Third Group. OSTRACIONTINA.

7. Ostracion, *Art.* 255
a. *Ostracion.*
1. triqueter, *L.*.......... 256
2. trigonus, *L.* 256
3. bicaudalis, *L.* 257
4. quadricornis, *L.* 257
5. gibbosus, *L.* 258
6. concatenatus, *Bl.* 259
7. cubicus, *L.* 260
8. sebæ, *Blkr.* 261
9. punctatus, *Bl. Schn.* .. 261
10. renardi, *Blkr.* 262
11. solorensis, *Blkr.* 262
12. ornatus, *Holl.* 262
13. nasus, *Bl.* 263
14. rhinorhynchus, *Blkr.* .. 263
15. diaphanus, *Bl. Schn.* .. 264
16. fornasini, *Bianc.* 264
17. cornutus, *L.* 265
β. *Aracana.*
1. aculeata, *Houttuyn* 266
2. unistriata, *Kaup* 266
3. aurita, *Shaw*.......... 266
4. ornata, *Gray* 267
5. lenticularis, *Rich.* 268
Ostracion boops, *Rich.*.... 268

Fam. 2. GYMNODONTES.

First Group. TRIODONTINA.

1. Triodon, *Reinw.*.......... 270
1. bursarius, *Reinw.*...... 270

Second Group. TETRODONTINA.

2. Xenopterus, *Bibr.* 270
1. naritus, *Rich.* 271
2. modestus, *Blkr.* 271
3. Tetrodon, *L.* 271
a. *Hemiconiatus.*
1. guttifer, *Benn.*........ 272
β. *Gastrophysus.*
2. lagocephalus, *L.* 273
3. lævigatus, *L.* 274
4. lunaris, *Bl. Schn.*...... 274
5. sceleratus, *Forst.*...... 276
6. honckenii, *Bl.* 276
7. hypselogenion, *Blkr.* .. 277
8. oblongus, *Bl.* 278
9. ocellatus, *Osb.*........ 279
10. rubripes, *Schleg.* 279
11. hamiltonii, *Rich.* 280
12. vermicularis, *Schleg.* .. 280
13. stictonotus, *Schleg.* 281
14. pardalis, *Schleg.* 281
15. politus, *Girard* 281
γ. *Cheilichthys.*
16. testudineus, *L.*........ 282
17. heraldi, *Gthr.* 283
annulatus, *Jen.*........ 283
18. formosus, *Gthr.* 283
19. spengleri, *Bl.* 284
20. turgidus, *Mitch.* 285
21. richei, *Fréminv.* 285

Page
22. multistriatus, *Rich.* 285
23. psittacus, *Bl. Schn.* 286

δ. *Liosaccus.*

24. cutaneus, *Gthr.* 287
25. pachygaster, *M. & T.* .. 287
26. porphyreus, *Schleg.* 287
27. angusticeps, *Jen.* 287

ε. *Crayracion.*

28. palembangensis, *Blkr.* .. 288
29. liurus, *Blkr.* 288

ζ. *Chelonodon.*

30. patoca, *H. B.* 288
31. viridipunctatus, *Day* .. 289
32. waandersii, *Blkr.* 289

η. *Monotretus.*

33. cutcutia, *H. B.* 290

θ. *Arothron.*

34. fahaka, *Hasselq.* 290
35. pustulatus, *Murray* 291
36. immaculatus, *Bl. Schn.* 291
carduus, *Cant.* 292
cochinensis, *Day* 292
37. nigropunctatus, *Bl. Schn.* 293
diadematus, *Rüpp.* 293
38. mappa, *Less.* 293
39. stellatus, *Bl. Schn.* 294
40. reticularis, *Bl. Schn.* .. 296
41. hispidus, *Lacép.* 297
42. bondarus, *Cant.* 298
43. erythrotænia, *Blkr.* 298
44. meleagris, *Lacép.* 299
45. firmamentum, *Schleg.* .. 299
46. fluviatilis, *H. B.* 299

ι. *Anosmius.*

47. margaritatus, *Rüpp.* 300
48. papua, *Blkr.* 301
49. bennetti, *Blkr.* 301
50. janthinopterus, *Blkr.* .. 302
51. punctatissimus, *Gthr.* .. 302
52. amboinensis, *Blkr.* 302
53. rostratus, *Bl.* 303
54. caudacinctus, *Rich.* 303
ornatus, *Poey* 303
55. caudofasciatus, *Gthr.* .. 304
56. sanctæ helenæ, *Gthr.* .. 304
57. striolatus, *Q. & G.* 304
58. rivulatus, *Schleg.* 305
59. valentini, *Blkr.* 305
brunneus, *Brevoort* 271
lineolatus, *Poey* 271
grammatocephalus, *Schl.* 271
cochinchinensis, *Steind.* . 271
blochii, *Casteln.* 271
4. Diodon, *Gthr.* 306
1. hystrix, *L.* 306
2. spinosissimus, *Cuv.* 307
3. maculatus, *Gthr.* 307
Page
bocagei, *Steindachner* .. 308
4. maculifer, *Kaup* 309
5. Chilomycterus, *Gthr.* 309
1. calorii, *Bianc.* 309
2. geometricus, *Bl. Schn.* .. 310
3. antennatus, *Cuv.* 311
4. orbicularis, *Bl.* 312
5. echinatus, *Gronov.* 312
6. jaculiferus, *Cuv.* 313
7. reticulatus, *L.* 313
8. tigrinus, *Cuv.* 314
9. affinis, *Gthr.* 314
6. Dicotylichthys, *Kaup* 314
1. punctulatus, *Kaup* 315
7. Atopomycterus, *Blkr.* 315
1. nychthemerus, *Cuv.* 315
8. Trichodiodon, *Blkr.* 316
1. pilosus, *Mitch.* 316
9. Trichocyclus, *Gthr.* 316
1. erinaceus, *Gthr.* 316

Third Group. MOLINA.

10. Orthagoriscus, *Bl. Schn.* .. 317
1. mola, *L.* 317
alexandrini, *Ranzani* .. 319
analis, *Ayres* 319
2. lanceolatus, *Lienard* .. 319
3. truncatus, *Retz.* 320

Subclass II. DIPNOI.

Fam. 1. SIRENOIDEI.

1. Protopterus, *Owen* 322
1. annectens, *Owen* 322
2. Lepidosiren, *Fitz.* 322
1. paradoxa, *Fitz.* 323

Ceratodus forsteri, *Krefft* .. 323

Subclass III. GANOIDEI.

Order 1. HOLOSTEI.

Fam. 1. AMIIDÆ.

1. Amia, *L.* 325
1. calva, *L.* 325

Fam. 2. POLYPTERIDÆ.

1. Polypterus, *Geoffr.* 326, 517
1. bichir, *Geoff.* 326, 517
2. Calamoichthys, *Smith* 327
1. calabaricus, *Smith* 328

Fam. 3. LEPIDOSTEIDÆ.

1. Lepidosteus, *Lacép.* 328
1. viridis, *Gm.* 329
2. platystomus, *Kirtl.* 329
productus, *Cope* 330
3. osseus, *L.* 330

Page

Order II. CHONDROSTEI.

Fam. 1. ACIPENSERIDÆ.

1. Acipenser, *Artedi* 333, 517
   1. ruthenus, *L.* 335
   2. glaber, *Fitz.* 335
   3. brandtii, *Gthr.* 336, 517
   4. transmontanus, *Rich.* .. 336
   5. naccarii, *Bonap.* .. 336, 517
   6. brachyrhynchus, *Ayres* . 337
   7. nasus, *Heck.* 337, 517
   8. huso, *L.* 338
   9. sinensis, *Gray* 338
   10. rubicundus, *Lesueur* 338
   11. maculosus, *Lesueur* 339
   12. stellatus, *Pall.* 340
   13. güldenstädtii, *Brdt. & R.* 340
   heckelii, *Fitz. & Heck.* 341, 517
   14. liopeltis, *Gthr.* 341
   15. brevirostris, *Lesueur* .. 341
   16. mediorostris, *Ayres* 342
   17. sturio, *L.* 342
   18. agassizii, *Dum.* 344
   19. acutirostris, *Ayres* 344
   lævis, *Agass.* 333
   schypa, *Brandt & R.* .. 333
   dauricus, *Georgi* 333
   caryi, *Dum.* 333
   putnami, *Dum.* 333
   dabryanus, *Dum.* 333
   sturioides, *Malm.* 333
   schrenckii, *Brandt* 517
   bærii, *Brandt* 517
2. Scaphirhynchus, *Heck.* 345
   1. cataphractus, *Gray* 345

Fam. 2. POLYODONTIDÆ.

1. Polyodon, *Lacép.* 346
   1. folium, *Lacép.* 346
   2. gladius, *Martens* 347

Subclass IV. CHONDROPTERYGII.

Order I. HOLOCEPHALA.

Fam. 1. CHIMÆRIDÆ.

1. Chimæra, *L.* 349
   1. monstrosa, *L.* 349
   2. colliei, *Benn.* 350
   3. affinis, *Capello* 350
2. Callorhynchus, *Gronov.* .. 351
   1. antarcticus, *Lacép.* 351

Order II. PLAGIOSTOMATA.

First Suborder. SELACHOIDEI.

Fam. 1. CARCHARIIDÆ.

Group. A. CARCHARIINA.

1. Carcharias, *Cuv.* 357

Page

a. Scoliodon.
   1. laticaudus, *M. & H.* .. 358
   2. acutus, *Rüpp.* 358
   3. dümerilii, *Blkr.* 359
   4. walbeehmii, *Blkr.* 359
   5. terræ novæ, *Rich.* 360
   porosus, *Poey* 357

β. Physodon.
   6. mülleri, *M. & H.* 360

γ. Aprionodon.
   7. brevipinna, *M. & H.* .. 361
   8. punctatus, *Mitch.* 361
   9. acutidens, *Rüpp.* 361

δ. Hypoprion.
   10. macloti, *M. & H.* 362
   11. brevirostris, *Poey* 362
   signatus, *Poey* 362
   12. hemiodon, *M. & H.* 362
   13. playfairii, *Gthr.* 362

ε. Prionodon.
   14. glaucus, *L.* 364
   15. munsing, *Blkr.* 365
   16. porosus, *Ranz.* 365
   17. obscurus, *Lesueur* .. 366, 518
   18. sorrah, *M. & H.* 367
   19. dussumieri, *M. & H.* .. 367
   20. gangeticus, *M. & H.* .. 367
   leucas, *M. & H.* 368
   21. amblyrhynchus, *Blkr.* .. 368
   22. fasciatus, *Blkr.* 368
   23. brachyurus, *Gthr.* 369
   tiburo, *Poey* 369
   24. melanopterus, *Q. & G.* .. 369
   25. bleekeri, *Dum.* 370
   26. albomarginatus, *Rüpp.* .. 370
   27. menisorrah, *M. & H.* .. 371
   28. borneensis, *Blkr.* 371
   29. amboinensis, *M. & H.* .. 372
   30. lamia, *Risso* 372
   31. glyphis, *M. & H.* 373
   32. limbatus, *M. & H.* 373
   33. pleurotænia, *Blkr.* 374
   34. temminckii, *M. & H.* .. 374
   35. oxyrhynchus, *M. & H.* . 375
   zambezensis, *Ptrs.* 363
   falciformis, *M. & H.* .. 363
   henlei, *Dum.* 363
   remotus, *Dum.* 363
   cæruleus, *Mitch.* 363
   obtusus, *Poey* 363
   maou, *Less.* 363
2. Hemigaleus, *Blkr.* 375
   1. microstoma, *Blkr.* 375
   2. macrostoma, *Blkr.* 376
3. Loxodon, *M. & H.* 376
   1. macrorhinus, *M. & H.* . 376
4. Galeocerdo, *M. & H.* 377

Page
1. arcticus, *Faber* 377
2. rayneri, *M'Donald & Barron* 377
3. tigrinus, *M. & H.* 378
5. Thalassorhinus, *M. & H.* .. 378
1. vulpecula, *M. & H.* 378
2. platyrhynchus, *Walb.* .. 379
6. Galeus, *Cuv.* 379
1. canis, *Bonap.* 379
2. japonicus, *M. & H.* 380

Group B. ZYGÆNINA.

7. Zygæna, *Cuv.* 380
1. blochii, *Cuv.* 380
2. malleus, *Risso* 381, 518
3. tudes, *Cuv.* 382
4. tiburo, *L.* 382
5. mokarran, *Rüpp.* 383

Group C. MUSTELINA.

8. Triænodon, *Gthr.* 383
1. obesus, *Rüpp.* 383
9. Leptocarcharias, *Gthr.* 384
1. smithii, *M. & H.* 384
10. Triacis, *M. & H.* 384
1. scyllium, *M. & H.* 384
2. semifasciata, *Girard* .. 384
henlei, *Gill* 384
11. Mustelus, *Cuv.* 385
1. lævis, *Risso* 385
canis, *Mitch.* 386, 518
2. vulgaris, *M. & H.* 386
3. manazo, *Blkr.* 387
4. antarcticus, *Gthr.* 387
5. maculatus, *Kner & St.* .. 387
dorsalis, *Gill* 388
californicus, *Gill* 385

Fam. 2. LAMNIDÆ.

Group A. LAMNINA.

12. Lamna, *Cuv.* 389
1. cornubica, *Gm.* .. 389, 518
2. spallanzanii, *Bonap.* 390, 518
3. glauca, *M. & H.* 391
13. Carcharodon, *M. & H.* 391
1. rondeletii, *M. & H.* 392, 518
14. Odontaspis, *Agass.* 392
1. americanus, *Mitch.* 392
2. ferox, *Risso* 393
15. Alopecias, *M. & H.* 393
1. vulpes, *Gm.* 393, 518

Group B. SELACHINA.

1. Selache, *Cuv.* 394
1. maxima, *Gunner* .. 394, 518

Page
Pseudotriacis, *Capello* 395
1. microdon, *Cap.* 395

Fam. 3. RHINODONTIDÆ.

18. Rhinodon, *Smith* 396
1. typicus, *Smith* 396

Fam. 4. NOTIDANIDÆ.

19. Notidanus, *Cuv.* 397
1. griseus, *Gm.* 397
2. cinereus, *Gm.* 398
3. platycephalus, *Tenore* .. 398
4. indicus, *Cuv.* 398

Fam. 5. SCYLLIIDÆ.

20. Scyllium, *M. & H.* 400
1. marmoratum, *Benn.* 400
2. maculatum, *Bl. Schn.* .. 401
3. edwardsii, *Cuv.* 401
4. canicula, *L.* 402
5. stellare, *L.* 403
6. capense, *M. & H.* 404
7. bürgeri, *M. & H.* 404
8. laticeps, *Dum.* 404
9. bivium, *M. & H.* 405
10. chilense, *Guich.* 405
11. africanum, *Gm.* 405
21. Pristiurus, *Bonap.* 406
1. melanostomus, *Bonap.* .. 407
22. Ginglymostoma, *M. & H.* . 407
1. cirratum, *Gm.* 408
2. mülleri, *Gthr.* 408
3. brevicaudatum, *Gthr.* .. 408
4. concolor, *Rüpp.* 409
23. Stegostoma, *M. & H.* 409
1. tigrinum, *Gm.* 409
24. Parascyllium, *Gill* 410
1. variolatum, *Dum.* 410
25. Chiloscyllium, *Gthr.* 410
1. ocellatum, *Gm.* 410
2. trispeculare, *Rich.* 411
malaisianum, *Less.* 411
3. indicum, *Gm.* 411
4. punctatum, *M. & H.* .. 413
26. Crossorhinus, *M. & H.* 413
1. barbatus, *Gm.* 414
2. tentaculatus, *Ptrs.* 414
3. dasypogon, *Blkr.* 414

Fam. 6. CESTRACIONTIDÆ.

27. Cestracion, *Cuv.* 415
1. philippi, *Lacép.* 415
2. quoyi, *Fréminv.* 416
3. francisci, *Girard* 416
4. galeatus, *Gthr.* 416

Page

Fam. 7. SPINACIDÆ.

28. Centrina, *Cuv.* 417
  1. salviani, *Risso* 417
29. Acanthias, *M. & H.* 417
  1. vulgaris, *Risso* 418
  2. blainvillii, *Risso* 419
  3. uyatus, *Bonap.* 419
30. Centrophorus, *M. & H.* 419
  1. granulosus, *Bl. Schn.* 420
    moluccensis, *Blkr.* 421
  2. lusitanicus, *Boc. & Cap.* 421
  3. crepidater, *Boc. & Cap.* 421
  4. squamosus, *Gm.* 422
  5. dumerilii, *Johns.* 422
  6. ringens, *Boc. & Cap.* 423
  7. calceus, *Lowe* 423
  8. cœlolepis, *Boc. & Cap.* 423
31. Spinax, *M. & H.* 424
  1. niger, *Bonap.* 424
  2. pusillus, *Lowe* 425
32. Centroscyllium, *M. & H.* 425
  1. fabricii, *Rnhdt.* 425
33. Scymnus, *Gthr.* 425
  1. lichia, *Cuv.* 426
34. Læmargus, *Gthr.* 426
  1. borealis, *Scoresb.* 426
  2. rostratus, *Risso* 427, 518
35. Euprotomicrus, *Gill* 427
  1. labordii, *Q. & G.* 428
36. Echinorhinus, *Blainv.* 428
  1. spinosus, *Gm.* 428
37. Isistius, *Gill* 429
  1. brasiliensis, *Q. & G.* 429

Fam. 8. RHINIDÆ.

38. Rhina, *Klein* 430
  1. squatina, *L.* 430

Fam. 9. PRISTIOPHORIDÆ.

39. Pristiophorus, *M. & H.* 431
  1. cirratus, *Lath.* 432
  2. nudipinnis, *Gthr.* 432
  3. owenii, *Gthr.* 432
  4. japonicus, *Gthr.* 433

Second Suborder. BATOIDEI.

Fam. 1. PRISTIDÆ.

1. Pristis, *Lath.* 436
  1. perrotteti, *M. & H.* 436
  2. pectinatus, *Lath.* 437
  3. antiquorum, *Lath.* 438
  4. zysron, *Blkr.* 438
  5. cuspidatus, *Lath.* 439

Page

Fam. 2. RHINOBATIDÆ.

2. Rhynchobatus, *Gthr.* 440
  1. ancylostomus, *Bl. Schn.* 440
  2. djeddensis, *Forsk.* 441
3. Rhinobatus, *Gthr.* 441
  1. thouini, *Lacép.* 442
  1*a*. spinosus, *Gthr.* 518
  2. halavi, *Forsk.* 442
  3. granulatus, *Cuv.* 443
    philippi, *M. & H.* 443
  4. obtusus, *M. & H.* 443
  5. undulatus, *Olfers* 444
    horkelii, *M. & H.* 444
    cemiculus, *Geoff.* 444
  6. leucorhynchus, *Gthr.* 444
  7. bougainvillii, *M. & H.* 445
  8. schlegelii, *M. & H.* 445
  9. banksii, *M. & H.* 446
  10. columnæ, *M. & H.* 446
  11. blochii, *M. & H.* 447
  12. brevirostris, *M. & H.* 447
    productus, *Girard* 441, 518
    jaram, *Montrouzier* 441
4. Trygonorhina, *M. & H.* 447
  1. fasciata, *M. & H.* 448

Fam. 3. TORPEDINIDÆ.

5. Torpedo, *Dum.* 448
  1. hebetans, *Lowe* 449
  2. narce, *Risso* 449
  3. marmorata, *Risso* 450
  4. panthera, *Ehrenb.* 451
  5. smithii, *Gthr.* 451
  6. fuscomaculata, *Ptrs.* 451
    occidentalis, *Storer* 448
    sinus persici, *Kämpfer.* 448
    chilensis, *Guichen.* 448
6. Narcine, *Henle* 452
  1. tasmaniensis, *Rich.* 452
  2. timlei, *Henle* 452
  3. lingula, *Rich.* 452
  4. brasiliensis, *Olf.* 453
    californica, *Ayres* 452
7. Hypnos, *Duméril* 453
  1. subnigrum, *Dum.* 453
8. Discopyge, *Tschudi* 453
  1. tschudii, *Tsch.* 454
9. Astrape, *M. & H.* 454
  1. capensis, *Gm.* 454
  2. dipterygia, *Bl. Schn.* 454
10. Temera, *Gray* 455
  1. hardwickii, *Gray* 455

Fam. 4. RAJIDÆ.

11. Raja, *Cuv.*
  1. clavata, *L.* 456

Page
2. maculata, *Montag.* 458
3. punctata, *Risso* 458
4. maderensis, *Lowe* 459
5. undulata, *Lacép.* 459
6. radiata, *Donov.* 460
7. asterias, *M. & H.* 460
8. miraletus, *L.* 460
9. atra, *M. & H.* 461
10. radula, *De la Roche* 461
11. kenojei, *M. & H.* 461
12. eglanteria, *Lacép.* 462
13. circularis, *Couch* 462
14. lemprieri, *Rich.* 463
15. batis, *L.* 463
binoculata, *Girard* 464
16. agassizii, *M. & H.* 465
17. marginata, *Lacép.* 465
18. lintea, *Fries* 466
19. maroccana, *Bl. Schn.* .. 466
bramante, *Sassi* 466
20. smithii, *M. & H.* 467
21. fullonica, *L.* 467
22. macrorhynchus, *Bonap.* 468
23. vomer, *Fries* 468
24. oxyrhynchus, *L.* 469
25. nasuta, *M. & H.* 469
brasiliensis, *M. & H.* .. 455
capensis, *M. & H.* 455
jojenia, *Cocco* 455
oxyrhynchus, *Bl.* 455
ocellata, *Mitch.* 455
desmarestia, *Lesueur* .. 455
lima, *Poeppig* 455
meerdervoortii, *Blkr.* .. 455
chinensis, *Basil.* 455
cooperi, *Girard* 455
scobina, *Philippi* 455
lævis, *Mitch.* 455
mosaica, *Capello* 455
12. Psammobatis, *Gthr.* 470
1. rudis, *Gthr.* 470
13. Sympterygia, *M. & H.* .. 470
1. bonapartii, *M. & H.* .. 470
14. Platyrhina, *M. & H.* 470
1. sinensis, *Lacép.* 471
2. schönleinii, *M. & H.* .. 471

Fam. 5. TRYGONIDÆ.

15. Urogymnus, *M. & H.* 471
1. asperrimus, *Bl. Schn.* .. 471
16. Ellipesurus, *Schomburgk* .. 472
1. spinicauda, *Schomb.* 472
17. Trygon, *Adanson* 472
1. uarnak, *Forsk.* 473
2. gerrardi, *Gray* 474
3. punctata, *Gthr.* 474
4. bleekeri, *Blyth* 475
5. walga, *M. & H.* 475
6. polylepis, *Blkr.* 475
7. nuda, *Gthr.* 476
8. hastata, *Dekay* 476
9. strongyloptera, *Schomb.* 476
10. thalassia, *Columna* 477
11. brucco, *Bonap.* 477
12. violacea, *Bonap.* 477
13. pastinaca, *L.* 478
14. kuhlii, *M. & H.* 479
15. margarita, *Gthr.* 479
16. rudis, *Gthr.* 479
17. ukpam, *J. A. Smith* 480
18. bennettii, *M. & H.* 480
19. tuberculata, *Lacép.* 480
20. imbricata, *Bl. Schn.* 481
21. zugei, *M. & H.* 481
22. hystrix, *M. & H.* 482
23. orbicularis, *Bl. Schn.* .. 482
24. sephen, *Forsk.* 482
purpurea, *M. & H.* 472
guttata, *Bl. Schn.* 472
spinosissima, *Dum.* 472
atrocissimus, *Blyth* 472
marginatus, *Blyth* 472
18. Tæniura, *M. & H.* 483
1. lymma, *Forsk.* 483
2. meyeni, *M. & H.* 483
3. melanospila, *Blkr.* 484
4. grabata, *Geoff.* 484
5. motoro, *M. & H.* 484
müIleri, *Casteln.* 484
6. orbignyi, *Casteln.* 484
magdalenæ, *Dum.* 483
humboldtii, *Roulin* 483
19. Urolophus, *M. & H.* 485
1. cruciatus, *Lacép.* 485
2. armatus, *M. & H.* 485
3. torpedinus, *Desmar.* 485
4. testaceus, *M. & H.* 486
5. javanicus, *Martens* 486
20. Pteroplatea 486
1. altavela, *L.* 486
2. hirundo, *Lowe* 487
3. maclura, *Lesueur* 487
4. micrura, *Bl. Schn.* 487
5. tentaculata, *M. & H.* .. 488
6. zonura, *Blkr.* 488
crebripunctata, *Ptrs.* .. 486

Fam. 6. MYLIOBATIDÆ.

Group A. MYLIOBATINA.

21. Myliobatis, *Cuv.* ....
1. aquila, *L.* 489
2. cornuta, *Gthr.* 490
3. vespertilio, *Blkr.* 490

Page
4. maculata, *Gray* 490
5. bovina, *Geoffr.* 490
6. nieuhofii, *Bl. Schn.* 491
7. milvus, *M. & H.* 491
bispinosus, *Storer* 488
freminvillii, *Lesueur* .. 488
vespertilio, *Girard* 489
22. Aëtobatis, *M. & H.* 492
1. narinari, *Euphrasen* 492
23. Rhinoptera, *Kuhl* 493
1. marginata, *Cuv.* 493
2. jussieui, *Cuv.* 493
3. lalandii, *M. & H.* 494
4. javanica, *M. & H.* 494
5. quadriloba, *Lesueur* 494
6. adspersa, *M. & H.* 494
7. polyodon, *Gthr.* 495
peli, *Blkr.* 493

Group B. CERATOPTERINA.

24. Dicerobatis, *Blainv.* 496
1. giornæ, *Lacép.* 496
2. japonica, *M. & H.* 496
3. eregoodoo, *Cant.* 497
4. kuhlii, *M. & H.* 497
5. olfersii, *Müll.* 497
25. Ceratoptera, *M. & H.* 497
1. vampyrus, *Mitch.* 498
2. ehrenbergii, *M. & H.* .. 498

Subclass V. CYCLOSTOMATA.

Fam. 1. PETROMYZONTIDÆ.

1. Petromyzon, *Artedi* 500
1. marinus, *L.* 501
2. fluviatilis, *L.* 502
3. branchialis, *L.* 504
4. ayresii, *Gthr.* 505
Page
?5. macrostomus, *Burm.* .. 506
argenteus, *Kirtl.* 500
lamottenii, *Lesueur* 500
appendix, *Dekay* 500
concolor, *Kirtl.* 500
bicolor, *Lesueur* 500
unicolor, *Dekay* 500
borealis, *Agass.* 500
cæruleus, *Philippi* 500
landbecki, *Philippi* 500
Chilopterus, *Philippi* 500
æpyptera, *Abbott* 500
camtschaticus, *Pall.* 500
2. Ichthyomyzon, *Gthr.* 506
1. tridentatus, *Rich.* 506
2. astori, *Girard* 507
3. castaneus, *Girard* 507
4. hirudo, *Girard* 507
3. Mordacia, *Gray* 507
1. mordax, *Rich.* 507
4. Geotria, *Gray* 508
1. australis, *Gray* 508
2. chilensis, *Gray* 509

Fam. 2. MYXINIDÆ.

1. Myxine, *L.* 510
1. glutinosa, *L.* 510
2. affinis, *Gthr.* 511
3. australis, *Jen.* 511
2. Bdellostoma, *Müll.* 511
1. cirrhatum, *Forst.* 511
2. polytrema, *Girard* 512

Subclass VI. LEPTOCARDII.

Fam. CIRROSTOMI.

1. Branchiostoma, *Costa* 513
1. lanceolatum, *Pall.* 513

CATALOGUE

OF

FISHES.

Subclass I. TELEOSTEI.

(CONTINUED.)

Order IV. PHYSOSTOMI.

(CONTINUED.)

Fam. 26. GYMNOTIDÆ.

Gymnotini, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 13; *Reinhardt, Vid. Meddel. naturh. Foren. Kjöbenh.* 1852 (1853), p. 135; or *in Wiegm. Arch.* 1854, p. 167.

Head scaleless; barbels none. Body elongate, eel-shaped. Margin of the upper jaw formed in the middle by the intermaxillaries, and laterally by the maxillaries. Dorsal fin absent or reduced to an adipose strip; caudal generally absent, the tail terminating in a point. Anal fin exceedingly long. Ventrals none. Extremity of the tapering tail capable of being reproduced. Vent situated at or a short distance behind the throat. Humeral arch attached to the skull. Ribs well developed. Gill-openings rather narrow. Air-bladder present, double. Stomach with a cæcal sac and pyloric appendages. Ovaries with oviducts.

Freshwater fishes from Tropical America.

Synopsis of the Genera.

A. Body scaly; no electric organ.
  I. Caudal fin present.
    A rudimentary dorsal fin .... 1. STERNARCHUS, p. 2.
  II. Tail terminating in a free point.
    Teeth none .... 2. RHAMPHICHTHYS, p. 4.
    Both jaws with a patch or band of very small teeth. 3. STERNOPYGUS, p. 7.
    A series of conical teeth in each jaw ... 4. CARAPUS, p. 8.

B. Body naked; an electric organ.
    A series of conical teeth in each jaw ... 5. GYMNOTUS, p. 10.

1. STERNARCHUS.

Sternarchus, sp., *Bl. Schn.* p. 497.
Apteronotus, *Lacép.* ii. p. 208.
Sternarchus, *Cuv. Règne Anim.*; *Müll. & Trosch. Hor. Ichthyol.* iii. p. 15; *Reinhardt, Vidensk. Meddel. naturh. Foren. Kjöbenh.* 1852 (1853), or *Wiegm. Arch.* 1854, p. 183.

Tail terminating in a distinct small caudal fin. Teeth small. A rudimentary dorsal fin is indicated by an adipose band fitting into a groove of the back of the tail; it is easily detached so as to appear as a thong-like appendage, fixed in front. Branchiostegals four.

Brazil and Guyanas.

The species may be divided into two subgenera:—

a. STERNARCHUS. *Snout compressed, of moderate length.*

1. Sternarchus albifrons.

Gymnotus albifrons, *L. Syst. Nat.* i. p. 428; *Pall. Spic. Zool.* vii. p. 36, tab. 6. fig. 1.
Apteronotus passan, *Lacép.* ii. p. 209, pl. 6. fig. 3 (bad).
Sternarchus albifrons, *Bl. Schn.* p. 497, tab. 94; *Casteln. An. Amér. Sud, Poiss.* p. 91, pl. 45. fig. 1; *Kaup, Apod.* p. 126; *Steindachner, Sitzgsb. Ak. Wiss. Wien*, 1868, lviii. p. 249.
—— lacepedii, *Casteln. l. c.* p. 93, pl. 45. fig. 3.
—— maximiliani, *Casteln. l. c.* p. 93, pl. 45. fig. 4.

Snout compressed, of moderate length; eye small, nearer to the end of the snout than to the gill-opening; the mouth is cleft to below the orbit; vent immediately behind the vertical from the orbit. Brown or black, with a white band along the median line of the upperside of the head, sometimes extending along the back; the thin portion of the tail with two white rings. A. 140–162.

Brazil and Surinam.

a. Half-grown. Pará. (A. 151.)
b. Half-grown. Santarem. From Mr. Bates's Collection. (A. 140.)
c. Adult. (A. 153.)

2. Sternarchus brasiliensis.

Reinhardt, Vidensk. Meddel. naturh. Foren. Kjöbenh. 1852 (1853); or *Wiegm. Arch.* 1854, p. 182.

Closely allied to *St. albifrons*.

Uniform dark brown. Mouth rather short. Eyes very small. Vent at a short distance behind the eyes. A. 177–185.

Rio das Velhas.

3. Sternarchus nattereri.

Steindachner, Sitzgsber. Ak. Wiss. Wien, 1868, lviii. p. 251, taf. 2. fig. 1.

The upper profile of the snout descends in a strong curve from the nape to the mouth. The length of the snout is rather less than one-half of that of the postorbital part of the head; mouth small, scarcely extending to the minute eye. Vent below the eye. Intermaxillary teeth none. The depth of the body is once and a half the length of the head. Uniform brownish. A. 197. (*Steind.*)

Barra do Rio Negro.

4. Sternarchus schotti.

Steindachner, l. c. p. 252, taf. 1. figs. 1, 2.

The upper profile of the snout is but little convex; length of the snout rather less than one-half of that of the postorbital part of the head. Mouth small, not extending to the eye. Intermaxillary teeth forming a double series. The depth of the body equals the length of the head. (*Steind.*)

Barra do Rio Negro.

5. Sternarchus bonapartii.

Casteln. l. c. p. 92, pl. 45. fig. 2; *Kaup, Apod.* p. 126.

Uniform brownish; head blackish. Cleft of the mouth very wide, extending behind the eyes. Vent before the eyes, at a short distance from the mandibulary symphysis. A. 165.

River Amazons.

This species appears to have been described from a skin.

β. RHAMPHOSTERNARCHUS. *Snout produced into a long tube.*

6. Sternarchus oxyrhynchus.

Müll. & Trosch. Hor. Ichthyol. iii. p. 16, taf. 2. figs. 1, 2; *Kaup, Apod.* p. 127.

Snout produced into a long tube, slightly arched downwards, nearly twice as long as the postorbital part of the head. Mouth very small, its length being only twice the diameter of the eye. Vent below the eyes. Anal fin commencing in advance of the gill-opening. The depth of the body is half the length of the head. Uniform brown. A. 205–215.

Essequibo.

a. Sixteen inches long. British Guyana. Presented by Sir R. Schomburgk.

7. Sternarchus macrostoma.

Snout produced into a long, nearly straight tube, the small eye being midway between the root of the pectoral and the extremity of the snout. Cleft of the mouth wide, more than half the length of the snout. Mandible with a series of fine teeth on each side. Vent somewhat behind the vertical from the eye. Anal fin commencing in front of the gill-opening. The greatest depth of the body is two-thirds of the length of the head. Scales on the back and ventral parts very small, those in the middle of the side of moderate size. Uniform blackish brown, posterior part of the anal and caudal black with whitish margins. A. 202.

Upper Amazons.

a. Fourteen inches long. Xeberos. From Mr. Bartlett's Collection.

8. Sternarchus mormyrus.

Steindachner, Sitzgsber. Ak. Wiss. Wien, 1868, lviii. p. 253, taf. 1. fig. 3.

Snout produced into a long tube, which is bent downwards; the very small eye midway between the extremity of the snout and the root of the pectoral. Mouth very narrow, its cleft scarcely twice as long as the diameter of the eye. Vent in advance of the eye. A. 210–230. The greatest depth of the body is contained once and three-fifths in the length of the head.

Upper Amazons.

a. Adult (tail lost, body $2\frac{1}{2}$ inches deep). Peruvian Amazons. From Mr. Bartlett's Collection.

2. RHAMPHICHTHYS.

Rhamphichthys, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 15.

Caudal fin none. Teeth none. No trace of a dorsal fin. No free orbital margin.

Brazil and Guyanas.

The species may be divided into two subgenera:—

a. RHAMPHICHTHYS. *Snout produced into a tube; vent below or in advance of the eyes; anal fin commencing at the throat.*

1. Rhamphichthys rostratus.

Seba, iii. tab. 32. fig. 5 (ii. tab. 69. no. 3??).
Gymnotus, sp., *Gronov. Zoophyl.* no. 167; *Mus. Ichth.* no. 73.
Gymnotus rostratus, *L. Syst. Nat.* i. p. 428; *Gronov. Syst.* ed. *Gray*, p. 22.
—— longirostratus, *Lacép.* ii. p. 178.
Rhamphichthys rostratus (part.), *Müll. & Trosch. Hor. Ichthyol.* iii. p. 15; *Steindachner, Sitzgsb. Ak. Wiss. Wien*, 1868, lviii. p. 256.
—— schomburgkii, *Kaup, Apod.* p. 135, fig. 10; *Steindachner, l. c.* p. 258.
—— schneideri, *Kaup, Apod.* p. 136, fig. 11.

The distance of the centre of the eye from the gill-opening is one-half or nearly one-half of that from the end of the snout. Scales very small, only those near the lateral line (which is naked) being a little larger. Brown; head, body, and fins with darker, sometimes ocellated spots.

In full-grown examples (35–37 inches) the vent and urogenital papilla is placed far in advance of the eyes, whilst in younger individuals (24–30 inches) it is below or but slightly in advance of the eyes.

Guyanas.

a, b–c. Fine specimens, 30–34 inches long. Surinam. From Hr. Kappler's Collection.
d. Adult. Surinam. From the Collection of Dr. van Lidth de Jeude.
e. Half-grown. British Guyana.

2. Rhamphichthys blochii.

Gymnonotus rostratus, *Bl. Schn.* p. 522, tab. 106 (not *L.*).
Rhamphichthys reinhardtii, *Kaup, Apod.* p. 132, fig. 8.
—— blochii, *Kaup, Apod.* p. 133, fig. 9.

The distance of the centre of the eye from the gill-opening is two-thirds of that from the end of the snout. Scales very small, only those near the lateral line being larger; head, body, and anal fin with irregular brownish-black spots and dots.

The vent is below the eye in a specimen 19 inches long, somewhat before the eye in one of 25 inches, and considerably in advance of it in a third of 29 inches.

Brazil.

a. Nineteen inches long. Pará. (Named *Rh. rostratus* by Dr. Kaup.)

3. Rhamphichthys pantherinus.

Rhamphichthys marmoratus, *Castel. Anim. Amér. Sud, Poiss.* p. 86, pl. 46. fig. 2; *Kaup, Apod.* p. 132, fig. 7.
—— pantherinus, *Castel. l. c.* fig. 3; *Kaup, Apod.* p. 131, fig. 6.

Rhamphichthys lineatus, *Castel. l. c.* p. 87, pl. 47. fig. 1; *Kaup, Apod.* p. 130, fig. 5.

The eye is not much more distant from the end of the snout than from the gill-opening. Coloration apparently variable:—1. Head without markings; four dark longitudinal stripes on the side (*lineatus*). 2. Greater part of the head spotted with black; back with three rows of black spots surrounded by white dots; lower part of the sides marbled and dotted (*pantherinus*). 3. Head and body marbled with brown (*marmoratus*).

Araguay. River Ucayale.

This species is distinguished by its comparatively short snout, the situation of the vent evidently varying as in its congeners.

β. BRACHYRHAMPHICHTHYS. *Snout not tubiform; vent behind the eyes; anal fin commencing below the pectorals.*

4. Rhamphichthys artedii.

Seba, iii. tab. 32. fig. 2.

Rhamphicthys artedi, *Kaup, Apod.* p. 128.

Snout more than one-third of the length of the head. Eye small, nearer to the end of the snout than to the gill-opening. Yellowish brown, marked with darker; fins without markings. Anal fin commencing under the extremity of the pectoral; vent below the posterior third of the head. A. 220–223. (*Kaup.*)

River Mona (French Guiana).

5. Rhamphichthys mulleri.

Kaup, Apod. p. 129.

Snout more than one-third of the length of the head. Eye of moderate size, nearer to the end of the snout than to the gill-opening. Upperside of the head and back uniform black; lower part of the sides of head and body with numerous spots; fins black, with brown rays. Anal fin commencing below the extremity of the pectoral; vent below the posterior half of the head. A. 220. (*Kaup.*)

French Guiana.

6. Rhamphichthys brevirostris.

Steindachner, Sitzgsber. Ak. Wiss. Wien, 1868, lviii. p. 254, taf. 2. fig. 2.

Snout less than one-third of the length of the head; eye of moderate size. The depth of the body is a little more than the length of the head. Mouth very narrow. Body with numerous irregular, narrow, oblique brownish cross bands. (*Steindachner.*)

Rio Guaporé.

3. STERNOPYGUS*.

Sternopygus, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 13.

Caudal fin none; no trace of a dorsal fin. Both jaws with a patch or band of small villiform teeth; a patch of minute teeth on each side of the palate. Anterior nostrils on the upperside of the head. Snout short or of moderate length; vent behind the orbit.

Tropical America.

1. Sternopygus carapus.

Seba, iii. tab. 32. figs. 3–4.

Gymnotus, sp., *Gronov. Zoophyl.* no. 168; *Mus. Ichth.* i. p. 29. no. 72.

Gymnotus carapo, *L. Syst. Nat.* i. p. 427; *Bloch,* v. p. 59, tab. 157. fig. 2; *Gronov. Syst.* ed. *Gray,* p. 22.

—— macrurus, *Bl. Schn.* p. 522.

Carapus macrourus, *Cuv. Règne An.*

Sternopygus macrurus, *Müll. & Trosch. l. c.* p. 14; *Kaup, Apod.* p. 137; *Steindachner, Sitzgsber. Ak. Wiss. Wien,* 1868, lviii. p. 259.

Carapus arenatus, *Eyd. & Soul. Voy. Bonite, Zool.* i. p. 210, pl. 8. fig. 2.

—— sanguinolentus, *Casteln. An. Am. Sud, Poiss.* p. 85, pl. 46. fig. 1.

Sternopygus marcgravii, *Reinh. Vidensk. Meddel. naturh. Foren. Kjöbenh.* 1852 (1853); or *Wiegm. Arch.* 1854, p. 180.

Orbit with a free circular margin. Eye small, about one-fourth of the length of the snout. Mouth of moderate width. Uniform brown or black, a black blotch above the gill-opening; sometimes mottled with darker. Young examples sometimes with a yellow band along the side of the tail.

Tropical America.

a. Half-grown. Essequibo. Collected by Hr. Ehrhardt.

b, *c–d*. Adult (24 inches) and young. Surinam. Collected by Hr. Kappler.

e, *f*, *g–h*. Half-grown and young. Surinam. From the Collection of H. van Lidth de Jeude.

i–k. Adult and young: skins. From Gronow's Collection.

l, *m–o*. Adult and half-grown. Pará.

p. Half-grown. Rio das Velhas. Presented by Prof. Reinhardt.—One of the types of *St. marcgravii*.

2. Sternopygus virescens.

Sternarchus virescens, *Valenc. in D'Orb. Voy. Amér. Mérid. Poiss.* pl. 13. fig. 2.

Sternopygus tumifrons, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 14.

—— lineatus, *Müll. & Trosch. l. c.*; *Kaup, Apod.* p. 138; *Steindachner, l. c.* p. 261.

---

[*] 1. Gymnotus æquilabiatus, *Humboldt, Observ. Zool.* i. p. 46, pl. 10; *Kaup, Apod.* p. 142.—River Magdalena, New Granada.

Sternopygus microstomus, *Reinh. Vidensk. Meddel, naturh. Foren. Kjöbenh.* 1852 (1853); or *Wiegm. Arch.* 1854, p. 181.
—— virescens, *Kaup, Apod.* p. 137; *Steindachner, l. c.* p. 260.

Orbit without free eyelid. Eye of moderate size, about one-half of the length of the snout. Mouth very narrow, the length of the maxillary being about equal to the diameter of the orbit. Upper jaw overlapping the lower. Anal fin commencing below the pectoral, sometimes below its middle, sometimes nearer to its root. Brown.

Brazil and Guyanas.

a. Adult (14 inches). Surinam. Collected by Hr. Kappler.
b–c. Half-grown. Lagoa Santa. Presented by Prof. Reinhardt. —Typical of *St. microstomus*.
d–e. Half-grown. Xeberos. Collected by Mr. Edw. Bartlett.
f–g. Adult. River Parana. From the Haslar Collection.
h. Adult. From the Haslar Collection.
i, k. Half-grown. From the Collection of Dr. van Lidth de Jeude.

3. Sternopygus axillaris.

Orbit without free eyelid; its diameter is one-half of the length of the snout and two-thirds of the width of the interorbital space. Mouth of moderate width, obliquely directed upwards, with the jaws even in front when the mouth is closed; maxillary twice as long as orbit. Upper profile of the nape and head nearly straight and horizontal. Vent opposite the posterior rim of the orbit. Pectoral fin at least as long as the postorbital portion of the head. Anal fin commencing below the hinder third of the pectoral. The length of the head is nearly equal to the height of the body, and contained seven times and a half in the length to the end of the anal. Scales very small. A large blackish blotch on the commencement of the lateral line. A. 212.

Pará.

a. Fifteen inches long. (Named *Carapus macrourus*, Cuv., by Dr. Kaup.)

4. Sternopygus troschelii.

Sternopygus virescens, *Müll. & Trosch. l. c.* p. 14 (not *Valenc.*).
—— troschelii, *Kaup, Apod.* p. 139; *Steindachner, l. c.* p. 260.

Orbit without free eyelid. Eye of moderate size, about two-fifths of the length of the snout. Mouth of moderate width, the length of the maxillary being equal to twice the width of the orbit. Lower jaw longer than the upper. Anal fin commencing below the root of the pectorals. Coloration uniform. A. 230.

British Guyana.

4. CARAPUS.

Carapus, sp. *Cuv. Règne Anim.*
Carapus, *Müll. & Trosch. Hor. Ichthyol.* iii. p. 13.

Caudal fin none; no trace of a dorsal fin. A series of conical teeth in each jaw. Anterior nostrils wide, in the upper lip. Snout short or of moderate length, depressed. Vent behind the head.

Tropical America.

1. Carapus fasciatus.

Carapo, *Marcgr. Hist. Pisc.* p. 170; cop. by *Willughby, Hist. Pisc.* p. 115, tab. G 7. fig. 4.

Gymnotus, sp., *Seba,* iii. tab. 32. fig. 1.

Gymnotus fasciatus, *Pall. Spicil. Zool.* vii. p. 35.

—— albus, *Pall. l. c.* p. 36; *Bl. Schn.* p. 523.

—— brachyurus, *Bl.* taf. 157. fig. 1.

—— putaol, *Lacép.* ii. p. 176.

—— carapo, *Bl. Schn.* p. 521.

Carapus fasciatus, *Cuv. Règne Anim.*; *Müll. & Trosch. l. c.* p. 13; *Kaup, Apod.* p. 139; *Steindachner, Sitzgsber. Ak. Wiss. Wien,* 1868, lviii. p. 261.

—— brachyurus, *Cuv. l. c.*

—— inæquilabiatus, *Valenc. in d'Orb. Voy. Amér. Mérid. Poiss.* pl. 14 (tail incorrect).

—— albus, *Kaup, l. c.* p. 140.

Lower jaw projecting beyond the upper. Eye very small. Scales of moderate size. Vent below the gill-opening. Anal fin commencing behind the point of the pectoral. Young examples generally with more or less numerous oblique brown bars, which disappear with age or are broken up in spots; sometimes of a uniform dark coloration.

This species varies, not only in coloration, but still more in the form of the body and head. The "dorsum canaliculatum" can be observed in very fat examples, and the notch behind the anterior nostril is more distinct in old than in young examples. The number of the teeth cannot be used as a specific character, as it varies from 38 to 56 in the lower jaw, and from 26 to 40 in the upper.

From Brazil to Guatemala.

a. Half-grown. Brazil. Presented by Lord Stuart.

b. Young. River Capim. Purchased of Mr. Stevens.

c, d–e. Young. Bahia. Collected by Dr. Wucherer.

f. Young. Surinam. From the Collection of Dr. van Lidth de Jeude.

g, h, i–l. Adult, half-grown, and young. British Guyana.

m–n. Young. Essequibo. Collected by Hr. Ehrhardt.

o. Adult (17 inches). Berbice.

p. Adult. Trinidad. Purchased of Mr. Cutter.

q–r. Adult. Island of Grenada. Purchased of Mr. Higgins.

s–t. Half-grown. Rio Motagua. Collected by F. Godman, Esq.

u, v, w–x. Adult, half-grown, and young.

y. Young. Brazil. Presented by Professor Reinhardt.

5. GYMNOTUS.

Gymnotus, sp., *of elder authors.*
Gymnotus, *Cuv. Règne Anim.*
Electrophorus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 151.

Caudal and dorsal fins absent; anal extending to the end of the tail. Scales none. Teeth conical, in a single series, and with a few other teeth behind it in the middle of each jaw. The mucous membrane of the mouth with numerous lobes. Anterior nostril in a short tube near the margin of the lip. Eyes exceedingly small. Vent behind the throat. An electric organ along each side of the lower part of the tail.

Brazil and Guyanas.

1. Gymnotus electricus.

Electric Eel.

Richter, Mém. Acad. Paris, vii. 1729, p. 325.

De la Condamine, Voy. dans l'Amér. Mérid. 1743, 4to.

Ingram, Neue Physical. Belustig. i. 1750, p. 288 (Torpedo).

Allemand (Gravesand), Verhand. Maatsch. Haarlem, ii. 1755, p. 372, (Sidder-vis).

Gumilla, Descr. de l'Orénoque, iii. p. 136 (Poisson-Trembleur).

Gronov. Uitgezogene Verhandel. iii. p. 468, tab. 26. fig. 8 (Beef-aal).

Gymnotus, *Gronov. Act. Helvet.* iv. 1762, p. 27, tab. 3. figs. 1–3, and *Zoophyl.* p. 41. no. 169; *Seba,* iii. tab. 34. fig. 6; *Musschenbroek, Introduct. ad Philos. Nat. Lugd. Batav.* 1762, i. p. 290, and *in Rozier, Journal de Physique,* 1776, p. 331; *Le Roy, Observ. et Mém. sur la Phys.* viii. 1776, p. 331; *Schilling, Neue Abhandl. Akad. Berlin,* 1770, p. 68.

Congeraal, *Van der Lott, Verhandl. Maatsch. Haarlem,* 1762, p. 87.

Lamproie du Para, *La Condamine, Voy. à l'Amazone,* p. 154.

Fermin, Surinam, p. 59; *Bancroft, Nat. Hist. of Guyana,* p. 120; *Bajon, Mém. pour servir à l'hist. de Cayenne,* 1777, ii. p. 288; and in *Rozier, Journ. de Phys.* iii. 1774, p. 47.

Pringle, A Discourse on the Torpedo. Lond. Roy. Soc. 1775, 4to, pp. 32.

Gymnotus electricus, *L. Syst. Nat.* i. p. 427; *Bl.* ii. p. 43, taf. 156; *Williamson, Philos. Trans.* lxv. 1775, p. 94; *Garden, ibid.* p. 102; *Hunter, ibid.* p. 395, pls. 1–4; *Lacép.* ii. p. 146, pl. 6. fig. 1; *Bryant, Trans. Am. Phil. Soc.* ii. 1786, p. 166; *Flagg, ibid.* p. 170; *Fahlberg, Vetensk. Ak. ny Handl.* 1801, pp. 122–156; *Guisan, Bull. Sc. Soc. Philom.* i. 1. 1797, p. 32; *Cuv. Règne Anim.*; *Geoffroy St.-Hilaire, Ann. Mus. d'Hist. Nat.* i. 1802, pp. 15, with a plate; *Humboldt, Observat. Zool.* i. p. 49; *Knox, Edinb. Journ. Sc.* i. 1824, p. 96; *Bradley, in Charlesworth's Mag. Nat. Hist.* 1838, ii. p. 668; *Faraday, Philos. Trans.* 1839, p. 1; *Valentin, Neue Denkschrift. Allgem. Schweitz. Gesellsch.* vi. 1842, with 5 plates; *Della Chiaje, Nuov. Ann. Sc. Nat. Bologn.* viii. 1847, p. 286; *Gronov. Syst.* ed. *Gray,* p. 23; *Kupffer und Keferstein, in Henle und Pfeifer, Zeitschr. f. rat. Med.* ii. 1858, p. 344.

Humboldt, Versuche über die electrischen Fische. Erfurt, 1806, 8vo.

Langguth, Dissertatio de Torpedine recentiorum, genere Anguilla. Wittenburg, 1778, 4to, pp. 38.

Guisan, Comment. de Gymnoto electrico. Tubing. 1819, 4to, pp. 34.

Schönbein, Beobachtungen über die elektrischen Wirkungen des Zitteraales. Basel, 1841, 8vo.
Miranda, Esperimenti istituti sul Gimnoto elettrico. Napoli, 1845, 4to, pp. 18.
Pacini, Sulla struttura del organo elettrico del Gimnoto e di altri pesci elettrici, sulle condizioni elettromotrici di questi organi e loro comparazione a diverse pile elettriche. Firenze, 1852, 8vo, pp. 35.
Schultze, Zur Kenntniss der electrischen Organe der Fische. Halle, 1858, 4to, pp. 35, with two plates. (*Abhandl. ntrf. Gesellsch.*, Halle, vol. iv.)

Head much depressed; jaws equal in length; cleft of the mouth not extending to the eye. Blackish above.

Brazil and Guyanas.

a, b, c, d, e, f, g, h–i. Adult, half-grown, and young.
k. Adult: stuffed.

Fam. 27. SYMBRANCHIDÆ.

Symbranchii, *Müller, Abhandl. Ak. Wiss. Berlin*, 1846, p. 193.

Body elongate, naked or covered with minute scales; barbels none. Margin of the upper jaw formed by the intermaxillaries only, the well-developed maxillaries lying behind and parallel to them. Paired fins none. Vertical fins rudimentary, reduced to more or less distinct cutaneous folds. Vent situated at a great distance behind the head. Ribs present. Gill-openings confluent into one slit situated on the ventral surface. Air-bladder none. Stomach without cæcal sac or pyloric appendages. Ovaries with oviducts.

Fresh waters and coasts of Tropical America and Asia. Coasts of Western Australia and Van Diemen's Land.

Synopsis of the Groups and Genera.

A. Amphipnoina. Vent in the posterior half of the length. Humeral arch not attached to the skull.

Palatine teeth in a single series; an accessory breathing-sac. 1. *Amphipnous*, p. 13.

B. Symbranchina. Vent in the posterior half of the length. Humeral arch attached to the skull.

Palatine teeth in a narrow band; gills rudimentary ... 2. *Monopterus*, p. 14.

Palatine teeth in a band; gills well developed .... 3. *Symbranchus*, p. 15.

C. Chilobranchina. Vent in the anterior half of the length.

No teeth on the palate .... 4. *Chilobranchus*, p. 17.

Osteological Remarks.

The following remarks are made on the skeletons of

	Vertebræ.
Amphipnous cuchia	106 + 65
Monopterus javanensis	100 + 88
Symbranchus marmoratus	79 + 57
Symbranchus bengalensis	80 + 53
(*Chilobranchus dorsalis*)	21 + 52

The skull of the *Symbranchidæ* is distinguished by solid, firmly united bones, especially those of the temporal region being much expanded, not leaving any non-ossified space between them. The skull of *Monopterus* and *Symbranchus* is considerably elongate, the entire branchial apparatus being below the skull. It is much shorter in *Amphipnous*, in which only a part of the branchial apparatus is below the skull, the remainder being below the first four vertebræ. The maxillary and intermaxillary bones run parallel and are firmly attached to each other, the former extending further backwards, but being toothless. The ethmoid is distinct as a separate bone. The orbit is not marked by an osseous ring, its position being indicated only by the foramen for the optic nerve. Palatine bone extremely broad. The various opercular pieces can be clearly distinguished. Each half of the humeral arch is composed of three pieces, the lower (coracoid) being as usual the strongest and longest, bent forward for the symphysis with its fellow; the uppermost (suprascapula) is very small and semicartilaginous in *Amphipnous*, continued into a muscle, which is attached to the skull, there being no osseous connexion between the skull and humeral arch in this genus. In *Symbranchus* and *Monopterus* this bone is well developed, two-pronged, the upper prong being attached to the occipital.

There is also the greatest similarity of structure in the vertebral column of the genera named; the vertebræ are compressed, not longer than deep. Their superior processes are slender, scarcely as high as the centre of the vertebra; no inferior processes; the lateral are perfectly horizontal, quite at the lower side of the vertebræ, concave below, the processes of both sides forming together a concavity like one-half of a bivalve shell. The caudal vertebræ are provided with superior and inferior processes, which in *Symbranchus* and *Monopterus* are dilated, lanceolate, and in *Amphipnous* styliform. In all these fish the caudal portion of the vertebral column is much shorter than the abdominal portion. To each of the transverse processes a short thin rib is attached.

First Group. AMPHIPNOINA.

1. AMPHIPNOUS.

Amphipnous, *Müller*.
Pneumabranchus, *M'Clelland*.

Body covered with minute scales longitudinally arranged. Three branchial arches, with the branchial laminæ rudimentary, and with narrow slits between them. A sac for the reception of air communicates with the gill-cavity. Gill-membrane nearly entirely grown to the isthmus. Palatine teeth in a single series.

Bengal.

1. Amphipnous cuchia.

Dondoo Paum, *Russell*, pl. 35.
Unibranchapertura cuchia, *Ham. Buch. Fish. Gang.* pp. 16, 363, pl. 16. fig. 4.

Amphipnous cuchia, *Müller, in Abhandl. Akad. Wiss. Berl.* 1839, p. 244; *Cant. Mal. Fish.* p. 338; *Kaup, Apod.* p. 120.
Pneumabranchus striatus, *M'Clell. Calc. Journ. Nat. Hist.* v. pp. 192, 219, pl. 13.
—— leprosus, *M'Clell. l. c.* pp. 195, 219.
—— albinus, *M'Clell. l. c.* pp. 196, 219.
Anatomy: *Taylor in Gleanings of Science*, ii. p. 173, and *Edinb. Journ. Sc.* v. 1831, p. 33; *Hyrtl, Denkschr. Ak. Wiss. Wien*, 1858, xiv. c. tab.

Blackish or whitish, with or without numerous dark spots. Vert. 106/65.

Bengal.

a, b, c. Several adult and half-grown specimens. Calcutta.
d. Adult. Chillianwallah. From Dr. Cantor's Collection.
e, f, g. Adult. India.
h. Adult: skeleton. Calcutta.

Second Group. SYMBRANCHINA.

2. MONOPTERUS.

Monopterus, *Lacép.*
Fluta, *Bl. Schn.* p. 565.
Ophicardia, *M'Clelland.*
Apterigia, *Basilewsky.*

Body naked. Three branchial arches with the branchial laminæ rudimentary, and with moderately wide slits between them. No accessory breathing-sac. Gill-membrane nearly entirely grown to the isthmus. Palatine teeth small, in a narrow band.

East Indies to Japan and Northern China.

1. Monopterus javanensis.

Muræna alba, *Zuiew, Nov. Act. Ac. Sc. Petropol.* vii. 1793, p. 299, tab. 7. fig. 2.
Monopterus javanensis, *Lacép.* ii. p. 139; *Bleek. Verh. Bat. Gen.* xxiii. *M. O. Java*, p. 22; or xxv. *Symbr.* p. 59; or *Atl. Ichthyol. Mur.* p. 118, pl. 47. fig. 1.
Unibranchapertura lævis, *Lacép.* v. p. 658, pl. 17. fig. 3.
Monopterus javanicus, *Shaw, Zool.* iv. p. 33; *Cant. Mal. Fish.* p. 339, pl. 5. figs. 6–8 (head); *Kaup, Apod.* p. 123, pl. 5. figs. 6–8.
Synbranchus eurychasma, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 60.
Ophicardia phayriana, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 191, 218, pl. 12. fig. 1.
Synbranchus lævis, *M'Clell. l. c.* p. 230.
—— grammicus, *Cant. Ann. & Mag. Nat. Hist.* ix. p. 30.
Monopterus lævis, *Richards. Voy. Sulph. Ichth.* p. 116.
—— cinereus, *Richards. l. c.* p. 117, pl. 52. figs. 1–6 (not synon.); and *Ichth. Chin.* p. 315.
Monopterus? *vel* Synbranchus? xanthognathus, *Richards. l. c.* p. 118, pl. 52. fig. 7.
Monopterus marmoratus, *Richards. Ichth. Chin.* p. 315.
Monopterus? helvolus, *Richards. l. c.* p. 316.

Ophicardia xanthognatha, *Richards. l. c.*
Apterigia saccogularis, *Basilewsky, Nouv. Mém. Soc. Nat. Mosc.* x. 1855, p. 247, tab. 8. fig. 2.
—— nigromaculata, *Basilewsky, l. c.* p. 248, tab. 2. fig. 2.
—— immaculata, *Basilewsky, l. c.*

Tail narrow, tapering into a point. Vert. 100/88.

East-Indian archipelago; Continent from Siam to Northern China. Chinese Islands and Japan.

a. Adult. Batavia. From Dr. Cantor's Collection.
b. Large specimen, 35 inches long. Borneo.
c. Half-grown. Borneo.
d–g. Half-grown. Sarawak. Presented by the Marquis Doria.
h, *i*. Half-grown. East-Indian archipelago.
k, *l*. Adult and young. Siam.
m, *n*, *o–p*. Adult and half-grown. Formosa. From Consul Swinhoe's Collection.
q, *r–s*. Half-grown. Chusan. From Dr. Cantor's Collection. Types of *S. grammicus*.
t, *u–v*. Half-grown and young. China.
w. Half-grown. Hong Kong. From the Haslar Collection.
x. Adult. Ningpo. Purchased of Mr. Cuming.
y–z. Half-grown. North China. Purchased of Mr. Jamrach.
α, *β*, *γ–δ*. Adult, half-grown, and young. Japan.
ε. Half-grown. Presented by Sir A. Smith.

3. SYMBRANCHUS.

Symbranchus, *Bloch.*
Unibranchapertura, *Lacép.*
Ophisternon, *M'Clelland.*
Tetrabranchus, *Bleeker.*

Body naked. Four branchial arches with well-developed gills. No accessory breathing-sac. Gill-membrane free from the isthmus. Palatine teeth in a band.

Tropical America, East Indies to Australia.

1. Symbranchus marmoratus.

Muræna, sp., *Gronov. Zoophyl.* p. 39. no. 162.
Synbranchus marmoratus, *Bl.* ix. p. 87, tab. 418; *Bl. Schn.* p. 524; *Kaup, Apod.* p. 122.
—— immaculatus, *Bl.* ix. p. 87, tab. 419. fig. 1; *Bl. Schn.* p. 524, tab. 103. fig. 1; *Kaup, Apod.* p. 122.
—— transversalis, *Bl. Schn.* p. 87.
Unibranchapertura marmorata, *Lacép.* v. p. 658.
—— immaculata, *Lacép.* v. p. 658.
—— grisea, *Lacép.* v. p. 658.
—— lineata, *Lacép.* v. p. 658.
Synbranchus fuliginosus, *Ranzani, Nov. Comm. Ac. Scient. Inst. Bonon.* iv. 1840, p. 75, tab. 11. fig. 1.

Muræna lumbricus, *Gronov. Syst.* ed. *Gray*, p. 18.
Synbranchus vittatus, *Casteln. An. Amér. Sud*, p. 84, pl. 44. fig. 3.

Snout short, rounded or obtusely pointed; eyes small, rather close to the end of the snout. Gill-opening narrow, not extending to the side of the ventral surface, generally transverse, arched, frequently appearing as a longitudinal slit unless stretched out. Vert. 79/57.

Tropical America.

The varieties of this widely distributed species are numerous, especially with regard to the width of the snout and head, form of the gill-opening, width of the palatine band of teeth, and coloration; but it is evident, from an examination of a long series of examples, that the differences are not specific.

a, *b–c*, *d–e*. Adult, half-grown, and young. Bahia. From Dr. Wucherer's Collection.
f. Adult. Pará. Presented by R. Graham, Esq.
g–h. Adult. Pebas. From Mr. Hauxwell's Collection.
i. Young. Chyavetas (Upper Amazons). From Mr. Bartlett's Collection.
k–m. Half-grown. Pernambuco. Presented by J. P. G. Smith, Esq.
n. Adult. Surinam. From the Collection of Dr. van Lidth de Jeude.
o. Half-grown. Cayenne.
p, *q*, *r*. Adult, half-grown, and young. British Guyana.
s–t. Adult and half-grown (in bad state). Berbice.
u. Half-grown. Bogotá. Purchased of Mr. Cutter.
v. Adult. Trinidad. Purchased of Mr. Cutter.
w. Adult. Vera Cruz. Purchased of Mr. Cuming.
x. Adult. Guatemala. From Mr. Salvin's Collection.
y. Adult. Lake Peten. From Mr. Salvin's Collection.
z. Half-grown. Huamuchal. From Mr. Salvin's Collection.
α. Adult. Rio Chisoy. From the Collection of Messrs. Godman and Salvin.
β, *γ*, *δ–ε*. Adult and half-grown. Mexico. From M. Sallé's Collection.
ζ. Half-grown. Santa Lucia. Presented by Mr. Smith.
η. Adult. From the Collection of the Zoological Society.
θ. Several specimens. Boero?? Purchased of Mr. Cuming. Although these examples were received at the same time as numerous others from Ceylon and Booro, I do not believe that the statement regarding the habitat is correct.
ι. Adult: skeleton. Rio Chisoy. From the Collection of Messrs. Godman and Salvin.

2. **Symbranchus bengalensis.**

Ophisternon bengalensis, *M'Clell. Calc. Journ. Nat. Hist.* v. pp. 197, 200, tab. 11. figs. 1 & 2; *Kaup, Apod.* p. 121, tab. 15. fig. 76 (head).
? Ophisternon hepaticus, *M'Clell. l. c.* p. 198, figs. 3 & 4.

Symbranchus immaculatus, *Müller, Abhandl. Ak. Wiss. Berlin,* 1839, p. 245; *Cantor, Mal. Fish.* p. 337; *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 57; or *Nat. Tyds. Ned. Ind.* iii. *Borneo,* vi. p. 438.
—— gutturalis, *Richards. Voy. Ereb. & Terr. Fish.* p. 49, pl. 30. figs. 14–17.
Tetrabranchus microphthalmus, *Bleek. Nat. Tyds. Ned. Ind.* ii. p. 69.
Synbranchus bengalensis, *Bleek. Atl. Ichth. Mur.* p. 119, pl. 48. fig. 1.

Snout very short, subtruncate; eyes small, close to the end of the snout. Gill-opening of moderate width, extending to the side, or nearly so, of the ventral surface. Vert. 80/53.

Bengal. East-Indian archipelago. Dampier's archipelago.

a, b, c, d. Many adult, half-grown, and young specimens. River Hooghly.
e. Young. Philippine Islands. Purchased of Mr. Cuming.
f. Young. Dampier's archipelago. Presented by Sir J. Richardson.—Type of *S. gutturalis.*
g. Adult: skeleton. River Hooghly. From the Collection of the East-India Company.

3. Symbranchus caligans.

Cantor, Mal. Fish. p. 334, pl. 7.

Snout of moderate length, obtusely pointed; the minute eye is nearly opposite to the middle of the lip. Gill-opening very wide, extending up the side to the lateral line.

Pinang.

a. Type of the species. From Dr. Cantor's Collection.

Third Group. CHILOBRANCHINA.

4. CHILOBRANCHUS.

Cheilobranchus, *Richards. Voy. Ereb. & Terr. Fish.* p. 50.

Body naked*, compressed, subcylindrical in front, moderately elongate. Head small; snout very obtuse and short; mouth narrow, with the upper jaw slightly protractile; eye of moderate size. Teeth in the jaws in a single series; none on the palate. Gill-opening transverse, the gill-membrane not attached to the isthmus; hinder edge of the gill-opening with a raised lip. Four branchial arches, no slit behind the fourth; gills well developed; no accessory breathing-sac. Vent in the anterior half of the total length, with a minute papilla. Vertical fins reduced to a simple cutaneous fold, without rays. Intestinal tract straight—the stomachal dilatation being longer than the intestine proper, and provided with a short cæcal appendage near its upper end.

Australia and Van Diemen's Land.

---

* I am unable to find the minute scales mentioned by Sir. J. Richardson.

1. Chilobranchus dorsalis.

Cheilobranchus dorsalis, *Richards. l. c.* pl. 30. figs. 1–5.
—— aptenodytum, *Richards. l. c.* p. 51.

The length of the head is somewhat less than one-half of the distance between the gill-opening and the vent. Vert. 21/52.

Australia and Van Diemen's Land.

a. Adult. Penguin Island. Presented by Sir J. Richardson.—Type of *Ch. aptenodytum*.
b–c. Fine specimens, 90 millims. long. Van Diemen's Land. Presented by R. Gunn, Esq.
d–g. Adult and half-grown. North-west Australia. Presented by Sir J. Richardson.—Types of the species.
h, *i*. Several examples. Australia.

Fam. 28. MURÆNIDÆ.

Muræenoidei, *Müller, Abhandl. Ak. Wiss. Berl.* 1846, p. 193.

Body elongate, cylindrical or band-shaped, naked or with rudimentary scales. Vent situated at a great distance from the head. Ventral fin none. Vertical fins, if present, confluent, or separated by the projecting tip of the tail. Sides of the upper jaw formed by the tooth-bearing maxillaries, the fore part by the intermaxillary, which is more or less coalescent with the vomer and ethmoid. Humeral arch not attached to the skull. Stomach with a blind sac; no pyloric appendages. Organs of reproduction without efferent ducts.

Inhabitants of the freshwaters and seas of the temperate and tropical regions.

Synopsis of the Groups and Genera.

First Subfamily.

MURÆNIDÆ PLATYSCHISTÆ.

The branchial openings in the pharynx are wide slits.

I. *The tail is exceedingly elongate, the vent being close to the root of the pectoral fins. Nostrils of each side close together, in a hollow in front of the eye* .... A. NEMICHTHYINA.

Jaws produced into a long, slender bill .... 1. *Nemichthys*, p. 21.

II. *The tail is longer or not much shorter than the trunk. The heart is situated immediately behind the gills.*

A. *Tail exceedingly long. Muscular system very feebly developed; bones very thin. Stomach extremely distensible. Gill-openings separate* .... B. SACCOPHARYNGINA.

Snout very short; gape enormously wide .... 2. *Saccopharynx*, p. 22.

B. *Gill-openings ventral, united into a longitudinal slit. Muscular and osseous systems well developed. Stomach very distensible.* C. SYNAPHOBRANCHINA.

Pectoral and vertical fins well developed .... 3. *Synaphobranchus*, p. 23.

C. *Muscular and osseous systems well developed. Gill-openings separated by an interspace* *.

---

* Girard has described as a new genus and species a *Myrichthys tigrinus* from Adair Bay, Oregon (Proc. Ac. Nat. Sc. Philad. 1859, p. 58), referring it to Kaup's subfamily *Myrophinæ*. However, he describes, "the nostrils approximate the apex of the rostrum; the upper ones very small and placed opposite the inferior ones, which are conspicuous and tubular;" so that it is a matter of uncertainty whether this writer understood the character on which the family "*Ophisuridæ*" was founded.

a. *Nostrils superior or lateral; tongue free; end of the tail surrounded by the fin.*

α. Pectoral fins present .... D. ANGUILLINA.

Skin with rudimentary scales; teeth in bands; the dorsal fin commences at a considerable distance from the occiput .... 4. *Anguilla*, p. 23.

Scaleless. Jaws with an outer series of closely set teeth; dorsal fin commencing behind the base of the pectoral; mouth extending at least to below the middle of the eye .... 5. *Conger*, p. 37.

Scaleless. Fore part of the skull with large muciferous cavities. Teeth forming bands; dorsal fin commencing nearly above the gill-opening; mouth not extending beyond the middle of the eye........... 6. *Congromuræna*, p. 40.

Scaleless. Maxillary teeth biserial, vomerine teeth uniserial; dorsal fin commencing above the root of the pectoral; mouth extending slightly beyond the middle of the eye .... 7. *Uroconger*, p. 43.

β. Pectorals none .... E. HETEROCONGRINA.

Exceedingly elongate; snout very short........... 8. *Heteroconger*, p. 44.

b. *Nostrils superior or lateral; tongue not free; end of the tail surrounded by the fin* .... F. MURÆNESOCINA.

Pectoral fins; jaws with canine teeth in front; vomer with large, strong teeth.
9. *Murænesox*, p. 45.

Pectorals none. Posterior nostril superior, above the angle of the orbit.
10. *Nettastoma*, p. 48.

Pectorals none. Posterior nostril lateral, in front of the orbit.
11. *Saurenchelys*, p. 48.

Pectoral fins. Teeth of the jaws triserial, the middle series containing long canine teeth; vomer with a series of very small teeth.
12. *Oxyconger*, p. 48.

Pectoral fins. Teeth of the jaws biserial; vomer with a series of very long teeth .... 13. *Hoplunnis*, p. 49.

Pectoral fins. Dorsal and anal fins rudimentary. 14. *Neoconger*, p. 49.

c. *Nostrils labial; tongue not free; end of the tail surrounded by the fin* .... G. MYRINA.

Pectorals well developed; dorsal commencing behind the gill-opening; teeth in bands .... 15. *Myrus*, p. 49.

Pectorals well developed; dorsal commencing far behind the pectorals.
16. *Myrophis*, p. 50.

Pectorals well developed; dorsal commencing behind the gill-opening; teeth in tne jaws biserial .... 17. *Paramyrus*, p. 51.

Pectorals nearly invisible. Body short, much compressed.
18. *Chilorhinus*, p. 51.

Pectorals none. Body long, vermiform........... 19. *Murænichthys*, p. 52.

d. *Nostrils labial; tongue not free; end of the tail free.*
H. OPHICHTHYINA.

Vomerine teeth none................................. 20. *Liuranus*, p. 54.

Vomerine teeth .... 21. *Ophichthys*, p. 54.

III. *The tail is much shorter than the trunk. The heart is situated at a great distance behind the gills* .. I. PTYOBRANCHINA.

Pectorals none or small; vertical fins but little developed.
22. *Moringua*, p. 90.

Second Subfamily.

MURÆNIDÆ ENGYSCHISTÆ.

The branchial openings in the pharynx are narrow slits.

K. Murænina.

Pectoral and vertical fins well developed	23. *Myroconger*, p. 93.
Pectorals none; vertical fins well developed; posterior nostril a narrow round foramen	24. *Muræna*, p. 93.
Fins none, except a rudimentary one round the end of the tail.	25. *Gymnomuræna*, p. 133.
Pectorals none; vertical fins well developed; posterior nostril a long slit.	26. *Enchelycore*, p. 135.

First Subfamily.

MURÆNIDÆ PLATYSCHISTÆ.

The branchial openings in the pharynx are wide slits.

First Group. NEMICHTHYINA.

1. NEMICHTHYS.

Nemichthys, *Richards. Voy. Samarang, Fish.* p. 25.
Leptorhyncus, *Lowe, Ann. & Mag. Nat. Hist.* x. 1852, p. 54; *Mém. Ac. St. Pétersb. Sav. étrang.* vii. 1854, p. 171.
Belonopsis, *Brandt, ibid.* p. 174.

Exceedingly elongate, band-shaped; tail tapering into a point. Vent approximate to the pectorals, but the abdominal cavity extending far behind the vent. Jaws produced into a long, slender bill, the upper part being formed by the vomer and intermaxillaries. The inner surface of the bill covered with small tooth-like asperities. Eye large. The nostrils of each side are close together, in a hollow before the eye. Gill-openings wide, nearly confluent. Pectoral and vertical fins well developed.

Atlantic.

1. Nemichthys scolopacea.

Nemichthys scolopacea, *Richards. l. c.* pl. 10. figs. 1–3 (young, not good).
Leptorhyncus leuchtenbergii, *Lowe, ll. cc.*
Belonopsis leuchtenbergii, *Brandt, l. c.* c. fig.

Dorsal fin commencing immediately behind the occiput, anal behind the vent.

Atlantic.

a. Young. South Atlantic. Presented by Sir J. Richardson.—Type of the species.

b. Thirty-three inches long. Madeira. Purchased.—Head three inches, greatest depth of the head half an inch.

Second Group. SACCOPHARYNGINA.

2. SACCOPHARYNX.

Saccopharynx, *Mitchill, Ann. Lyc. New York,* i. 1824, p. 82.
Ophiognathus, *Harwood, Phil. Trans.* 1827, p. 277.

Deep-sea congers, with the muscular system very feebly developed, with the bones very thin, soft, and wanting in anorganic matter, connected by a lax, easily torn fibrous tissue.

Head and gape enormous. Snout very short, pointed, flexible, like an appendage overlapping the gape. [Only one nostril can be found in front of the small eye *.] Maxillary and mandibulary bones very thin, slender, arched, armed with one or two series of long, slender, curved, widely set teeth, their points being directed inwards; palate toothless. Gill-openings wide, at some distance from the head, at the lower part of the sides; gills very narrow, free, and exposed. Trunk of moderate length. Stomach distensible in an extraordinary degree. Vent at the end of the trunk. Tail band-like, exceedingly long, tapering into a very fine filament. Pectoral small, present. Dorsal and anal fins rudimentary; the former more so than the latter, and indicated by a groove bordered by a whitish line on each side, and commencing at a short distance behind the head. Now and then a short fine ray is visible towards the end of the trunk. Anal rays distantly placed, commence behind the vent, and are visible for some distance.

Temperate parts of the North Atlantic.

1. Saccopharynx flagellum.

Saccopharynx flagellum, *Mitchill, l. c.*
Ophiognathus ampullaceus, *Harwood, l. c.*
Saccopharynx ampullaceus, *Johnson, Ann. & Mag. Nat. Hist.* 1862, x. p. 277.

Uniform deep black.

a. Madeira. Presented by J. Y. Johnson.—Length of head (to the mandibulary joint) 2½ in., of trunk 6 in., of tail 25 in.
b. Young. Presented by Mrs. Philips.

Third Group. SYNAPHOBRANCHINA.

3. SYNAPHOBRANCHUS.

Synaphobranchus, *Johnson, Proc. Zool. Soc.* 1862, p. 169.

Gill-openings ventral, united into a longitudinal slit between the pectoral fins, separate internally. Pectoral and vertical fins well developed. Nostrils lateral, the anterior subtubular, the posterior round, before the lower half of the eye. Cleft of the mouth very wide; teeth small. Body scaly. Stomach very distensible.

---

* This part of the head is not in a good state of preservation, and the other nostril is most probably near the end of the snout.

Madeira. A deep-sea fish.

1. Synaphobranchus pinnatus.

Muræna, sp., *Gronov. Mus. Ichth.* ii. p. 11. no. 161.
Muræna pinnata, *Gronov. Syst.* ed. *Gray*, p. 19.
Synaphobranchus kaupii, *Johnson, Proc. Zool. Soc.* 1862, p. 169.

Jaws subequal in length, sometimes the lower, sometimes the upper the longer. Intermaxillary with an ovate patch of conical teeth, which are somewhat larger than the others; maxillary teeth in a narrow band, those of the inner series being conspicuously the largest; mandible with a single series gradually passing into a band behind. Vomerine teeth uniserial. Eye of moderate size. Tail twice as long as the body; vent somewhat in advance of the origin of the dorsal fin. Uniform brown.

Madeira.

a. Adult. Madeira. Presented by the Rev. R. T. Lowe.
b–c. Adult. Madeira. Presented by J. Y. Johnson, Esq.—Types of *S. kaupii*.
d. Adult. Madeira. Purchased.

Fourth Group. ANGUILLINA.

4. ANGUILLA[*].

Muræna, sp., *Artedi, Genera*, p. 23.
Anguilla, (*Thunberg*) *Cuv. Règne Anim.*
Muræna, *Bleeker, Atl. Ichth. Mur.* p. 1.

Small scales are imbedded in the skin. Upper jaw not projecting beyond the lower. Teeth small, forming bands. Gill-openings narrow, at the base of the pectoral fins. The dorsal fin commences at a considerable distance from the occiput.

---

[*] 1. Anguilla eurystoma, *Heck. & Kner, Süsswasserf.* p. 325.—Dalmatia.
2. Muræna serpentina, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 81.—Long Island, U.S.
3. Anguilla avisotis, *Richards. Voy. Sulph. Fish.* p. 104, pl. 51. fig. 1.—Canton. I hesitate to introduce this as a distinct species into the system, as it is known from a figure only, and has not been actually recognized in specimens. The distinctions between the species of eels are so slight that a mere figure ought not to be made the type of a species, unless it is known to have been made under the eye of an experienced ichthyologist.
4. —— clathrata, *Richards. Voy. Sulph. Ichthyol.* p. 104.—Canton.
5. —— fasciata, *Kaup, Apod.* p. 48, fig. 37.—Hab. — ?
6. —— macrops, *Kaup, Apod.* p. 49, fig. 38.—Hab. — ?
7. Anguilla angustidens, *Kaup, Apod.* p. 49, fig. 39.—Hab. — ?
8. —— eurylæma, *Kaup, Apod.* p. 50, fig. 40.—Hab. — ?
9. Muræna halmaherensis, *Bleek. Ned. Tydschr. Dierk.* i. p. 159; or *Atl. Ichthyol. Muræn.* p. 12, tab. 6. fig. 4.—Halmaheira.
10. Anguilla cantori, *Kaup, Apod.* p. 52, fig. 46.—Bombay.
11. Muræna macrocephala, *Rapp, Jahresh. Ver. Ntrk. Württemb.* 1849, p. 142, taf. 2.—Port Natal.

Cosmopolitan, but not extending into the arctic regions.

An infinite number of species have been described; but most are so badly characterized, or founded on individual or so trivial characters, that the majority of ichthyologists will reject them. For the present, I have retained those as species which are distinguished by such characters that we are enabled to recognize them; but I am by no means certain whether really specific value should be attached to them. The form of the snout, the size of the eyes, the width of the bands of teeth, &c. are evidently subject to much variation; and probably other ichthyologists will still more reduce the number of species contained in the following synopsis:—

Synopsis of the Species.

I. *The dorsal fin commences considerably in advance of the vent.*

a. *Eye considerably shorter than the snout.*

A. *The mandibulary band of teeth is longitudinally divided by a groove, the outer strip containing a series of somewhat larger teeth.*

1. The length of the head is conspicuously less than the distance between the commencements of the dorsal and anal fins.
1. *mauritiana*, p. 25.

2. The length of the head is nearly equal to the distance between the commencements of the dorsal and anal fins.

The length of the head is one-half of its distance from the anal.
2. *labiata*, p. 26.

The length of the head is more than one-half of its distance from the anal.
3. *fidjiensis*, p. 26.

3. The length of the head is conspicuously more than the distance between the commencements of the dorsal and anal fins.

Tail considerably longer than body .... 4. *bengalensis*, p. 27.

Tail not much longer than body .... 5. *reinhardtii*, p. 27.

B. *Lateral teeth uniserial in both jaws*... 6. *macrophthalma*, p. 28.

C. *Teeth in narrow bands; the mandibulary band without longitudinal groove.*

1. The length of the head is nearly equal to the distance between the commencements of the dorsal and anal fins.

The length of the head is more than one-half of its distance from the vent .... 7. *mossambica*, p. 28.

The length of the head is less than one-half of its distance from the vent.
8. *vulgaris*, p. 28.

2. The length of the head is conspicuously more than the distance between the commencements of the dorsal and anal fins.

---

12. Anguilla marmorata, *Quoy & Gaim. Voy. Freyc. Zool.* p. 241, pl. 51. fig. 2.—Waigiou.

13. —— otaheitensis, *Kaup, Aale Hamburg. Mus.* p. 17, tab. 2. fig. 2.—Tahiti.

14. —— capensis, *Kaup, l. c.* p. 18, tab. 2. fig. 3.—Cape of Good Hope.

Angle of the mouth below the eye; lips rather narrow.
9. *bostoniensis*, p. 31.
Angle of the mouth below the eye; lips well developed.
10. *texana*, p. 32.
Angle of the mouth below the hind margin of the eye; lips thick.
11. *latirostris*, p. 32.
Angle of the mouth distinctly behind the eye. 12. *aucklandii*, p. 33.

D. *Teeth equally small, forming broad flat bands.*

1. The vomerine band is scarcely or not broader than the maxillary band.

The length of the head is less than the distance between the commencements of the dorsal and anal fins; cleft of the mouth extending behind the eye .... 13. *delalandii*, p. 33.
The length of the head is more than the distance between the commencements of the dorsal and anal fins; cleft of the mouth extending far behind the eye .... 14. *aneitensis*, p. 34.
Angle of the mouth below the hind margin of the eye.
15. *amboinensis*, p. 34.

2. The vomerine band is much broader than the maxillary band.
16. *megastoma*, p. 34.

β. *Eye not shorter than the snout* .... 17. *kieneri*, p. 35.

II. *The dorsal fin commences above or nearly above the vent.*

A. *The dorsal fin commences above or slightly in advance of the vent.*

1. Vomerine band of teeth of moderate width.

a. Vomerine teeth extending about as far back as the maxillary.

Snout short, obtuse; lips thin; angle of the mouth below the hind margin of the eye, which is of moderate size or rather large.
18. *bicolor*, p. 35.
Lips well developed; angle of the mouth below the hind margin of the eye, which is of moderate size .... 19. *virescens*, p. 35.
Lips thin; angle of the mouth behind the small eye.
20. *sidat*, p. 36.

b. Vomerine band of teeth considerably shorter than the maxillary band .... 21. *australis*, p. 36.

2. Teeth forming exceedingly broad flat bands.
22. *amblodon*, p. 37.

B. *Origin of the dorsal fin behind the vent.* 23. *dussumieri*, p. 37.

I. *The dorsal fin commences considerably in advance of the vent.*

1. Anguilla mauritiana.

Anguilla mauritiana, *Bennett, Proc. Comm. Zool. Soc.* 1831, p. 128.
—— labrosa, *Richards. Voy. Ereb. & Terr. Ichth.* p. 113.
Muræna maculata, *Bleek. Ned. Tydschr. Dierk.* i. p. 237, or *Atl. Ichthyol. Muræn.* p. 9, tab. 1. fig. 2 (not *H. B.*).
—— ? manillensis, *Bleek. Atl. Ichthyol. Muræn.* p. 10, pl. 44. f. 2; or *Ned. Tydschr. Dierk.* 1864, p. 31.
Anguilla johannæ, *Günth. in Fish. Zanz.* p. 124.
Muræna marmorata, *Kner, Novara, Fisch.* p. 369.

The length of the head is equal to the distance of the gill-opening from the origin of the dorsal fin, somewhat less than one-half of its distance from the vent, and less than the distance between the commencements of the dorsal and anal fins. Lips broad and fleshy.

The cleft of the mouth extends to, or nearly to, and in old examples behind, the hind margin of the eye, which is small. Tail considerably longer than the body. The band of mandibulary teeth divided by a longitudinal groove. Brown mottled with black, or uniform blackish.

East-Indian Ocean and archipelago; Formosa; Pacific.

a. Type of *A. labrosa*, 36 inches long. South Seas.
b. Fine specimen. Amboyna. Purchased of Mr. Frank.
c. Adult: skin. Almorah. From Capt. Boyd's Collection.
d. Half-grown. Ceylon.
e. Young. Philippine Islands.
f, *g–h*. Adult and half-grown. Formosa. From Mr. Swinhoe's Collection.
i. Type of *A. johannæ*: stuffed. Island of Johanna. From Lieut.-Col. Playfair's Collection.
k, *l*. Half-grown.

I have long hesitated to unite the *Muræna manillensis* of Bleeker with this species; but after having examined all our examples, I came to the conclusion that the relative position of the eye and angle of the mouth is evidently subject to some variation in this species; and especially an example from the Philippine Islands, which in all other respects agrees most closely with *M. manillensis*, has the mouth cleft at least to below the hind margin of the eye. The principal character by which this species may be recognized is the advanced position of the dorsal fin.

2. Anguilla labiata.

Peters, Wiegm. Arch. 1855, p. 270, and *Mossamb. Flussfische*, p. 94, taf. 17; *Günth. in Fish. Zanzibar*, p. 124.

The length of the head is nearly equal to the distance of the gill-opening from the origin of the dorsal fin, or one-half of that from the origin of the anal fin. Lips broad and fleshy. The cleft of the mouth extends scarcely behind the eye, which is small. Tail considerably longer than the body. Mandibulary teeth divided into two strips by a longitudinal groove.

East coast of Africa.

a, *b*, *c–d*. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair and Dr. Kirk.
e, *f*. Half-grown. Port Natal. Purchased of Mr. Thomas Ayres.

3. Anguilla fidjiensis.

The length of the head is more than the distance of the gill-opening from the origin of the dorsal fin, and more than one-half of that from the origin of the anal fin, equal to the distance between the origins of the dorsal and anal fins. Lips broad and fleshy. The cleft of the mouth extends to below the hind margin of the eye, which is rather small. Tail longer than the body. Length of the pectoral two-fifths of the length of the head. Brown, mottled with darker.

Feejee Islands.

a. Twenty inches long. Kandavu. From the Godeffroy Museum, with the name *M. manillensis*.
b. Three and a half feet long: stuffed. Nairai. Collected by T. M. Rayner, Esq.

4. **Anguilla bengalensis.**

Muræna anguilla, *Ham. Buch. Fish. Gang.* p. 22.
—— maculata, *Ham. Buch. l. c.* p. 23 (not *Lacép.*).
—— bengalensis, *Gray, in Hardw. Ill. Ind. Zool.*
Anguilla elphinstonei, *Sykes, Trans. Zool. Soc.* ii. p. 377, pl. 67. fig. 3.
—— brevirostris, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 177, pl. 5. fig. 1.
—— arracana, *M'Clell. l. c.* p. 178, pl. 6. fig. 2.
—— nebulosa, *M'Clell. l. c.* p. 179, pl. 5. fig. 2; *Bleek. Verh. Bat. Gen.* xxv. *Nalcz. Bengal*, p. 153.
—— variegata, *M'Clell. l. c.* p. 179, pl. 9. fig. 7.
—— marmorata, *Kaup, Apod.* p. 43, fig. 32 (not *Quoy & Gaim.*).

Very closely allied to *A. latirostris*. The length of the head is contained once and one-fourth or once and one-third in the distance of the gill-opening from the origin of the dorsal fin, and twice, or very nearly twice, in its distance from the vent. Distance from the commencements of the dorsal and anal fins rather shorter than the head. Lips broad and fleshy; lower jaw prominent. Angle of the mouth immediately behind the eye, which is small. Tail considerably longer than the body. The band of mandibulary teeth is longitudinally divided by a groove.

Indian continent.

a, b–d. Adult and half-grown. River Hooghly.
e–f. Half-grown. Madras. Presented by Captain Mitchell.
g. Adult. Nilgherries. Collected by Surgeon F. Day.
h. Adult: stuffed. India. Purchased of Mr. Warwick.

5. **Anguilla reinhardtii.**

? Anguilla reinhardtii, *Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1867, lv. p. 15.

The length of the head is contained once and one-third in the distance of the gill-opening from the origin of the dorsal fin, one-half of its distance from the vent, and conspicuously more than the distance between the commencements of the dorsal and anal fins. Snout long, depressed, spatulate; lips fleshy. The cleft of the mouth extends to the vertical from, or scarcely beyond, the hind margin of the eye, which is small. Vomerine teeth in a band, which is rather broad anteriorly, being broader in the middle than the maxillary band, and extending equally far backwards. The mandibulary band of teeth is longitudinally divided by a narrow groove. Tail not much longer than the body. Upper parts greenish, with numerous black spots which disappear with age.

North-eastern Australia.

a. Twenty-seven inches long (tail 14 inches). Hawkesbury River. Presented by G. Krefft, Esq.
b. Young. Sydney. Presented by G. Krefft, Esq.
c–d. Several adult and half-grown specimens. Cape York. Collected by Herr Damel.
e. Adult: stuffed. Australia. Presented by Sir T. L. Mitchell.

I should not have hesitated to identify these specimens with *Anguilla reinhardtii*, Steindachner, if the author's description did not differ in one point of importance, viz. he describes the angle of the mouth as being situated one diameter of the eye *behind* the hind margin of the orbit.

6. **Anguilla macrophthalma.**

Muræna (Anguilla) macrophthalmos, *Peters, Monatsber. Ak. Wiss. Berl.* 1852, p. 684.
Anguilla macrophthalma, *Peters, Mossamb. Flussfische*, p. 99, taf. 19.

The length of the head is contained once and one-fourth in the distance of the gill-opening from the origin of the dorsal fin, twice and one-fifth in that from the vent, and is more than the distance between the commencements of the dorsal and anal fins. Lips moderately developed. The angle of the mouth is below the hinder half of the eye—which is large, rather more than one-half of the length of the snout. Lower jaw somewhat longer than the upper. Lateral teeth uniserial in both jaws. Tail considerably longer than body. (*Ptrs.*)

Zambezi.

7. **Anguilla mossambica.**

Tribranchus anguillaris, *Peters in Müller, Ganoid.* p. 193.
Anguilla mossambica, *Peters, Monatsber. Ak. Wiss. Berl.* 1852, p. 684; and *Mossamb. Flussfische*, p. 98, taf. 18. fig. 1.

The length of the head is more than the distance of the gill-opening from the origin of the dorsal fin, and contained once and two-thirds in its distance from the vent; it is nearly equal to the distance between the commencements of the dorsal and anal fins. Lips narrow. The cleft of the mouth extends to the vertical from the hind margin of the eye, which is rather small. Tail considerably longer than body. Mandible prominent; mandibulary teeth forming a narrow band without groove. (*Ptrs.*)

River Molumbo, east of the island of Mossambique.

8. **Anguilla vulgaris.**

Eel. Aal. Anguille.
Ἔγχελυς, *Aristot.* ii. c. 13, 15, & 17; iv. c. 8, 11, & 12; v. c. 5; vi. c. 13 & 16: viii. c. 2; *Athen.* lib. 7; *Ælian*, xiv. c. 8: *Oppian, Hal.* lib. 1.

Anguilla, *Bellon. De Aquat.* p. 295; *Rondel.* ii. p. 198; *Salv.* fol. 64; *Willughby*, p. 109, tab. G. 5; *Marsil.* iv. tab. 1. fig. 3.

Muræna, sp. no. 1, *Arted. Gen.* p. 24; *Spec.* p. 66; and *Synon.* p. 39; *Gronov. Zoophyl.* no. 166.

—— anguilla, *L. Syst.* i. p. 426; *Bl. Fisch. Deutschl.* iii. p. 4, taf. 73; *Bl. Schn.* p. 486; *Lacép.* iii. p. 90; *Meidinger*, tab. 31; *Jurine, Poiss. du Lac Léman*, pl. 1; *Faber, Fisch. Islands*, p. 60; *Pall. Zoogr. Ross.-As.* iii. p. 71; *Gronov. Syst.* ed. *Gray*, p. 18; *Ekström, Vet. Akad. Handl.* 1831, p. 285; *Nilss. Skand. Faun.* iv. p. 661.

Aal, *Pontopp. Norg. Nat. Hist.* ii. p. 174; *Ström, Söndm.* i. p. 265.

Eel, *Penn. Brit. Zool.* iii. p. 126, or edit. 1812, iii. p. 191; *Davy, Salmon.* Lond. 1829, p. 228; *Arderon, Phil. Trans.* xliv. 1746, p. 395; *Widdrington, Ann. Nat. Hist.* viii. 1842, p. 207.

Rifaud, Voy. Egypt. pl. 18. figs. 94 & 95.

Anguilla vulgaris, *Turt. Brit. Faun.* p. 87; *Fleming, Brit. Anim.* p. 199; *G. v. Martens, Ital.* ii. 1844, p. 334; *Drewsen, in Kröyer, Ntrhist. Tidskr.* i. p. 21; *Costa, Faun. Nap. Pesc.* pl. 55 & 59. fig. 1; *Günth. Fisch. d. Neckar's*, p. 128; *Rapp, Fisch. d. Bodensee's*, p. 38; *Siebold, Süsswasserf.* p. 342; *Malmgren, Wiegm. Arch.* 1864, p. 303; *Desmarest, Rev. et Mag. Zool.* 1866, p. 161; *Canestrini, Arch. Zool. Anat. &c.* iv. p. 177.

Anguilla canariensis, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 88, pl. 20. fig. 1.

—— callensis, *Guichenot, Explor. Algér. Poiss.* p. 111, pl. 7. fig. 1.

—— acutirostris *and* mediorostris, *Risso, Eur. Mérid.* iii. pp. 198, 199; *Yarrell, Proc. Zool. Soc.* 1831, p. 133; or *Zool. Journ.* iv. p. 469; or *Brit. Fish.* 2nd edit. ii. pp. 381 & 399, or 3rd edit. i. pp. 44, 65; *Parnell, Werner. Mem.* vii. p. 384; *Jenyns, Man.* p. 474; *Sélys-Longch. Faune Belge*, p. 225; *Costa, Faun. Nap. Pesc.* pl. 56 & pl. 59. figs. 4 & 5; *Couch, Hist. Brit. Fish.* iv. p. 306, pls. 34, 35.

Muræna oxyrhina, *Ekström, Fisch. Mörkö*, p. 142.

? Muræna pekinensis, *Basilewsky, Nouv. Mém. Soc. Nat. Mosc.* x. 1855, p. 246, tab. 3. fig. 2.

Anguilla migratoria, *Kröyer, Danm. Fisk.* iii. p. 616.

—— fluviatilis, *Heck. & Kner, Süsswasserf.* p. 319; *Heckel, Verh. zool.-bot. Ges. Wien*, ii. 1853, *Sitzgsber.* p. 29.

—— cuvieri, bibronii *, savignyi, morena, marginata, microptera, mediorostris, altirostris, platycephala, latirostris, acutirostris, nilotica, ægyptiaca, callensis, canariensis, *Kaup, Apod.* pp. 32–41, figs. 16–29.

? Anguilla novæterræ, *Kaup, Apod.* p. 45, fig. 35.

? Anguilla wabashensis, *Kaup, Apod.* p. 46.

Anguilla hibernica, *Couch, Brit. Fish.* iv. p. 328, pl. 235.

Costa, O. G., Storia ed anatomia dell' Anguilla e monografia delle nostrali specie di questo genere. Napoli, 1850, 4to, c. 9, tab.

Organs of propagation: *Leeuwenhoek, Arcana naturæ*, 1692, p. 316; *Allen, Philos. Trans.* xix. 1697, p. 664; *Dale, ibid.* xx. 1698, p. 90; *Vallisneri, Ephemer. Ac. Nat. Cur.* 1712, *Append.* p. 153; *Mundinus, Comm. Bonon. Sc. et Art. Acad.* vi. 1783, p. 410; *Müller, Schrift. Ges. ntrf. Freund.* i. 1780, p. 204; *Carlisle, Philos. Mag.*

---

* Hr. Kaup states that the diameter of the eye is contained only once in the length of the snout; but in the figure the eye is represented exactly as it is in Cuvier's "Pimperneaux," the *Anguilla cuvieri* of Kaup!

1822, p. 109; *Carr, ibid.* 1809, p. 272; *Rathke, Wiegm. Arch.* 1838, p. 299, and *in Müll. Arch.* 1850, p. 203; *Deslongchamps, Institut.* vi. 1838, p. 133; *Joannis, Rev. Zool.* 1839, p. 48; *Hornbaum-Hornschuch, Dissert. de Anguillarum sexu et propagatione,* Gryph. 1842; *Schlueser, Dissert. de Petromyzontum et Anguillarum sexu,* Dorpat, 1848.

Skeleton: *Agass. Poiss. Foss.* v. tab. D. fig. 2.

Monstrosity: *Deslongchamps, Mém. Soc. Linn. Normand.* v. 1835, p. 47.

The length of the head is contained once and one-half or once and one-third in the distance of the gill-opening from the origin of the dorsal fin, and twice and one-third or twice and two-thirds in its distance from the vent. Distance between the commencements of the dorsal and anal fins as long as or somewhat longer than the head. Lips narrow; lower jaw prominent. Angle of the mouth below the eye—which is rather small or of moderate size, much shorter than the snout. Maxillary teeth equal and small. Tail considerably longer than body.

Vert. $\frac{45-46}{71-68}$.

Europe to 64° 30′ N. lat. (*Malmgren*), but neither in the Danube nor in the Black or Caspian Seas; Mediterranean region; Northern Asia (?); North America *.

a. Fine specimen. Abergeldie Castle. Presented by Dr. Th. Günther.

b, c, d, e–g. Young. Firth of Forth. From Dr. Parnell's Collection.

h. Very large specimen. Tarporley. Presented by Sir Ph. de M. G. Egerton, Bart.

i–m. Young. Tunbridge. Presented by J. G. Children, Esq.

n–p. Young. Poole Heath. Presented by W. Thompson, Esq.

q, r, s–t, u–w. Adult and half-grown. England.

x, y–z. Half-grown and young. Bohuslän. Presented by Hr. A. W. Malm.

α, β. Adult. Holland. From the Collection of Dr. van Lidth de Jeude.

γ. Adult skin. Holland. From Gronow's Collection.

δ. Many young specimens. Bavaria. From Dr. Gemminger's Collection.

ε. Half-grown. Lisbon. Presented by the Rev. R. T. Lowe.

ζ. Young. Madeira. Presented by the Rev. R. T. Lowe.

η–κ. Adult and half-grown. Azores. Presented by F. du C. Godman, Esq.—These examples agree more with Kaup's *A. capitone* than Valenciennes's *A. canariensis,* having broad lips.

λ–ν. Half-grown. Algiers. Presented by Lieut.-Col. Playfair (*A. callensis*).

ξ, ο–π. Adult. Mediterranean.—The head is somewhat longer than in examples from more northern latitudes; and the eye is of moderate size, as in the so-called *A. bibronii*. They differ from specimens from the Nile only in this larger size of the eye.

---

* I have examined an example from New Jersey; it is in the Liverpool Museum.

ρ–τ. Adult. Propontis. From Mr. Millingen's Collection.

υ–ψ. Young. Bahr el Kelb (Palestine). From the Collection of the Rev. H. B. Tristram.

ω, *a′*, *b′*–*c′*, *d′*–*f′*, *g′*–*l′*. Adult and half-grown. Lower Nile.

m′, *n′*, *o′*, *p′*, *q′*. Adult, half-grown, and young.

r′. Adult: Skeleton. Propontis. From the Collection of Mr. Millingen. (Vert. 46/68.)

s′. Adult: Skeleton.

t′. Skulls of several examples.

9. Anguilla bostoniensis.

Muræna anguilla, *Schöpff, Beobacht. Ges. ntrf. Freund. Berlin*, viii. p. 138.
Anguilla vulgaris, *Mitch. Lit. & Phil. Trans. New York*, i. p. 360.
Muræna rostrata, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 81.
—— bostoniensis, *Lesueur, l. c.*
—— argentea, *Lesueur, l. c.* p. 82.
—— macrocephala, *Lesueur, l. c.*
Anguilla lutea (*Rafin.*), *Kirtland, Bost. Journ. Nat. Hist.* iv. p. 234, pl. 11. fig. 2.
—— tenuirostris, *De Kay, New York Faun. Fish.* p. 310, pl. 53. fig. 173; ? *Kaup, Apod.* p. 44, fig. 34; ? *Kner, Novara, Fisch.* p. 370.
—— bostoniensis, *Ayres, Boston Journ. Nat. Hist.* iv. p. 279: *Storer, Mem. Am. Acad.* viii. p. 408, pl. 33. fig. 1.
—— novæorleanensis, *Kaup, Apod.* p. 43, fig. 33.
—— punctatissima, *Kaup, Apod.* p. 44.
—— cubana, *Kaup, Apod.* p. 44.

Synonymy for extra-American Specimens.

Anguilla japonica, *Schleg. Faun. Japon. Poiss.* p. 258, pl. 113. fig. 2 (mouth not good); *Bleek. Verh. Bat. Genootsch.* xxv. *Nalez. Japan*, p. 51; *Kner, Novara, Fisch.* p. 370.

The length of the head is contained once and three-fourths in the distance of the gill-opening from the origin of the dorsal fin, and twice and one-half in its distance from the vent. Distance between the commencements of the dorsal and anal fins shorter than the head. Lips rather narrow; lower jaw slightly prominent. Angle of the mouth below the eye, which is rather small or of moderate size, much shorter than the snout. Tail considerably longer than the body.

United States; Japan; Formosa; China.

a, *b*, *c*–*d*. Adult and half-grown. Boston, Massachusetts.

e, *f*. Half-grown. Japan.

g. Half-grown. North China. Purchased of Mr. Jamrach.

h. Half-grown. China. From the Collection of the East-India Company.

i, *k*. Several half-grown specimens. Formosa.

10. Anguilla texana.

? Anguilla texana, *Kaup, Apod.* p. 45.
? Anguilla tyrannus, *Girard, U. S. & Mex. Bound. Ichth.* p. 75, pl. 40.

The length of the head is contained once and three-fourths in the distance of the gill-opening from the origin of the dorsal fin, and twice and one-third or twice and two-thirds in its distance from the vent. Distance between the commencements of the dorsal and anal fins shorter than the head. Lips well developed; lower jaw very prominent. Angle of the mouth below the eye, which is rather small. Tail considerably longer than the body. Mandibulary teeth in a single band without longitudinal groove.

Islands of Grenada and Dominica ; ? Texas ; ? Mexico.

This fish is scarcely specifically distinct from *A. bostoniensis*, from which it differs only by the greater development of the lips.

a. Adult. Grenada. Purchased of Mr. Cutter.
b–c. Adult. Dominica. Purchased of Mr. Cutter.
d. Young. Mexico (?). From M. Sallé's Collection.
e. Adult. Presented by the Royal College of Surgeons.

11. Anguilla latirostris.

Grigs or Gluts, *Penn. Brit. Zool.* iii. p. 129.
Rifaud, Voy. Egypt. pl. 18. fig. 91.
Anguilla latirostris, *Risso, Ichth. Nice*, p. 90, and *Eur. Merid.* iii. p. 199; *Yarrell, Proc. Zool. Soc.* 1831, p. 133, or *Zool. Journ.* iv. p. 469; *Brit. Fish.* 2nd edit. ii. p. 396, or 3rd edit. i. p. 62; *Parnell, Werner. Mem.* vii. p. 387; *Thompson, Ann. Nat. Hist.* 1839, ii. pp. 21, 270; *Jenyns, Man.* p. 474; *Sélys-Longchamps, Faune Belge*, p. 225; [? *Couch, Hist. Brit. Fish.* iv. p. 330, pl. 36. This figure is evidently taken from a common Eel with broadish snout]; *Cantor, Ann. & Mag. Nat. Hist.* 1842, p. 486; *Kaup, Apod.* p. 38, fig. 26.
Muræna platyrhina, *Ekström, Fisch. Mörkö*, p. 142.
Anguilla sinensis, *M'Clell. Calc. Journ.* iv. p. 406, tab. 25. fig. 2.
—— macroptera, *M'Clell. l. c.* p. 407, fig. 1.
—— dieffenbachii, *Gray, Dieffenbach's Travels. Append.* p. 225; *Richards. Voy. Ereb. & Terr. Ichthyol.* p. 113.
—— platyrhynchus, *Costa, Faun. Nap. Pesc.* tab. 58 & 60. fig. 3.
? Anguilla capitone, melanochir, ancidda, *Kaup**, *Apod.* pp. 34, 35, & 37, and figs. 17, 19, & 22.
See also Anguilla virescens, p. 36.

The length of the head is contained once and a half or once and three-fourths in the distance of the gill-opening from the origin of the dorsal fin, and twice and a half in its distance from the vent. Distance between the commencements of the dorsal and anal fins shorter than the head. Lips broad and fleshy; lower jaw prominent. Angle of the mouth below the hind margin of the eye, which is rather small, much shorter than the snout. Tail considerably longer than the body. Mandibulary teeth in a single band, without longitudinal groove.

---

* It is rather difficult to arrive at a safe conclusion with regard to certain specimens described by Dr. Kaup under specific names, as the measurements given are evidently frequently erroneous.

Europe; Nile; China; New Zealand; West Indies.

a. Fine specimen. Itchen. Purchased.
b–c. Adult and half-grown. Nice. Purchased of Messrs. Gal Frères.
d. Half-grown. Ningpo. Purchased of Mr. Cuming.
e. Adult. China. From Dr. Cantor's Collection.
f–g. Adult and half-grown. Chusan. From the Collection of the East-India Company.
h. Type of *A. dieffenbachii*. New Zealand. Presented by Dr. Dieffenbach.
i. Half-grown. St. Croix. Purchased of Mr. Stevens.
k. Young.

This form alone of the numerous varieties of the common Eel is, in my opinion, entitled to specific rank. The width and length of the snout cannot be taken as a distinctive character, as there are found all intermediate forms between the extremes; I am more inclined to consider the situation of the origin of the dorsal fin, and the development of the lips, to indicate a distinct species. Indeed the specimens referred by me to *A. latirostris* are more distinct from the typical European form than is the American Eel.

Although it appears to be hazardous to identify specimens from localities so distant as England and New Zealand, I could not come to any other conclusion after a very careful consideration of the slight differences observable in our examples. The New-Zealand specimen has a somewhat shorter tail, the length of the body being to that of the tail as seven to nine, whilst in Chinese examples it is as seven and a half to ten. This, of course, cannot be of specific value.

12. Anguilla aucklandii.

Richards. Voy. Ereb. & Ter. Fish. p. 113, pl. 45. figs. 7–13.

The length of the head is contained once and one-third in the distance of the gill-opening from the origin of the dorsal fin, one-half of its distance from the vent, and conspicuously more than the distance between the commencements of the dorsal and anal fins. Snout broad, short, depressed, subtruncate; lips broad. The angle of the mouth is distinctly behind the eye, which is small. Lower jaw scarcely longer than the upper. The band of vomerine teeth is anteriorly as broad as the maxillary band. Tail not much longer than the body. Uniform brown.

Auckland Island.

a, b, c. Types of the species. Presented by Sir J. Richardson.

13. Anguilla delalandii.

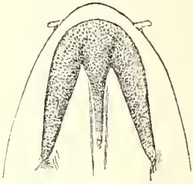
Anguilla delalandi, *Kaup, Apod.* p. 50, fig. 41.
? Anguilla capensis, *Castelnau, Poiss. Afr. Austr.* p. 73.

The length of the head is somewhat less than the distance of the gill-opening from the origin of the dorsal fin, two-fifths of its distance from the vent, and less than the distance between the commencements of the dorsal and anal fins. Lips moderately developed. The cleft of the mouth extends behind the eye, which is small. Tail longer than the body. Teeth equally small, forming flat broadish bands; the vomerine band is scarcely broader than that of the maxillary. Uniform brown.

South Africa.

a. Adult: stuffed. From the Collection of Sir A. Smith.

14. **Anguilla aneitensis.**



The length of the head is contained once and a third in the distance of the gill-opening from the origin of the dorsal fin, one-half of its distance from the vent, and conspicuously more than the distance between the commencements of the dorsal and anal fins. Snout depressed, rather broad, of moderate length, with the jaws even in front. Lips fleshy. The cleft of the mouth extends far behind the eye, which is rather small and situated above the third fourth of the length of the mouth. Teeth equally small, arranged in broad flat bands; the vomerine band is scarcely broader than that of the maxillary; it tapers behind, extending nearly as far back as the maxillary band. Tail considerably longer than the body. Uniform brown, lighter below.

Aneiteum.

a. Twenty-one and a half inches long (tail $12\frac{1}{4}$ inches). Collected by Mr. McGillivray.

15. **Anguilla amboinensis.**

Peters, Monatsber. Ak. Wiss. Berl. 1866, p. 523.

Origin of the dorsal fin twice as far distant from the pectoral fin as from the vent. The length of the head one-third of the distance of the vent from the end of the snout. Angle of the mouth below the hind margin of the eye. Teeth small, in broad bands, that of the vomer rather narrower than that of the maxillary. Yellowish brown, spotted with dark brown. (*Peters.*)

Amboyna.

16. **Anguilla megastoma.**

Kaup, Apod. p. 50, fig. 42.

Teeth equal in size, moveable, pointed, directed backwards, arranged in broad flat bands; the anterior part of the vomerine band is much smaller than that of the maxillary. Head much depressed. Total length 35·45 inches, tail 21·25 inches. (*Kaup.*)

"Megarava" (? Mulgrave archipelago).

17. Anguilla kieneri.

Kaup, Apod. p. 32, fig. 15.

Eye very large, somewhat exceeding the short snout in length. Total length 11·03 inches; to vent 4·92, to the gill-opening 1·58, to the origin of the dorsal fin 3·43. (*Kaup.*)

Toulon.

II. *Origin of the dorsal fin opposite or nearly opposite to the vent.*

18. Anguilla bicolor.

Muræna anguilla, *Russell*, tab. 31.
Anguilla bicolor, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 178, pl. 6. fig. 1.
—— moa, *Bleek. Verh. Bat. Gen.* xxiii. *Java*, p. 22; *Kner, Novara, Fisch.* p. 369.
—— mowa, *Bleek. l. c.* xxv. *Muræn.* p. 16 (part.); *Kaup, Apod.* p. 51, fig. 44.
—— malgumora, *Kaup, Apod.* p. 42, fig. 30; *Kner, l. c.* p. 367.
Muræna moa, *Bleek. Atl. Ichthyol. Muræn.* p. 11, tab. 4. fig. 1.
—— malgumora, *Bleek. l. c.* tab. 2. fig. 1.

The dorsal fin commences immediately in front of the vent. The length of the head is contained twice and one-third in the distance of the gill-opening from the vent. Snout rather short, broad, depressed, and obtuse. Angle of the mouth below the hind margin of the eye, which is of moderate size or rather large. Lips thin. Teeth equally small, forming broadish flat bands, the mandibulary band being as broad, or nearly so, as that of the vomer. The vomerine band extends as far or nearly as far backwards as the maxillary bands. Tail longer than the body.

East-Indian continent, Ceylon, Java.

a. Adult. Java. From Dr. Bleeker's Collection.
b. Half-grown. Java. From Dr. Bleeker's Collection (*M. malgumora*).
c. Adult. River Hooghly. From the Collection of the East-India Company.
d. Half-grown. Madras. Presented by Capt. Mitchell.
e, f, g–h, i–k, l–m. Half-grown and young. Ceylon.

19. Anguilla virescens.

Muræna (Anguilla) virescens, *Peters, Monatsber. Ak. Wiss. Berl.* 1852, p. 684; and *Mossamb. Flussf.* p. 101, taf. 18. fig. 2.

The dorsal fin commences at a very short distance in advance of the vent. The length of the head is contained twice and one-third in the distance of the gill-opening from the vent. Angle of the mouth below the hind margin of the eye, which is of moderate size. Lips well developed. Teeth equally small, forming bands of moderate width, that on the vomer extending backwards about as far as the maxillary bands. Tail longer than the body.

East coast of Africa.

a. Thirteen inches long. Zanzibar. From Lieut.-Col. Playfair's Collection.

b, c. Adult (31 inches long). Seychelles. Presented by Professor E. P. Wright.

How uncertain are the characters considered to be specific in this genus is evident from an examination of specimens *b* and *c*. There cannot be the least doubt that they belong to the same species; yet in one of the examples (which is somewhat smaller than the other), the origin of the dorsal is only slightly in advance of the vent, as is stated to be characteristic of *A. virescens*, and is also the case in specimen *a*. But in specimen *c* (31 inches long) the distance between the origin of the dorsal and the vent is not less than $2\frac{1}{2}$ inches; in fact it agrees so perfectly with *Anguilla latirostris* that, if similar examples should be found to be of common occurrence, and not exceptional only, one could not hesitate to refer *virescens* as a synonym to *latirostris*.

20. **Anguilla sidat.**

Anguilla sidat, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 17; *Kaup, Apod.* p. 53; *Kner, Novara, Fische,* p. 368.
—— bleekeri, *Kaup, Apod.* p. 52, fig. 45.
—— celebesensis, *Kaup, Apod.* p. 42, fig. 31.
Muræna sidat, *Bleek. Atl. Ichthyol. Muræn.* p. 10, tab. 3. fig. 3.

Scarcely distinct from *A. virescens.*

The dorsal fin commences above or immediately in front of the vent. The length of the head is contained twice in the distance of the gill-opening from the vent. Snout rather short, depressed, slightly pointed. Angle of the mouth extending to behind the small eye. Lips thin. Teeth equally small, forming broadish flat bands of nearly equal width. The vomerine band extends nearly as far backwards as the maxillary bands. Tail longer than the body.

East-Indian archipelago.

a. One of the typical specimens. From Dr. Bleeker's Collection.

Anguilla malabarica, Kaup, Apod. p. 52, fig. 47, from Malabar, would appear to be very closely allied to this species; but the dorsal fin is said to commence half an inch before the vent in an example $17\frac{1}{3}$ inches long.

21. **Anguilla australis.**

Anguilla australis, *Richards. Trans. Zool. Soc.* iii. p. 157; and *Voy. Ereb. & Ter. Fish.* p. 112, pl. 45. figs. 1–5; *Jenyns, Voy. Beagle, Fishes,* p. 142; *Bleek. Nat. Tydschr. Nederl. Ind.* xiii. p. 389, and *Atl. Ichth. Muræn.* p. 12, tab. 7. fig. 1.

The dorsal fin commences at a very short distance in advance of the anal fin. Thegth len of the head is contained twice and a third or twice and two-thirds in the distance of the gill-opening from the vent. Angle of the mouth below the posterior part of the eye. Lips fleshy. Teeth equally small, forming broadish flat bands, the mandibulary and vomerine bands being broader than the maxillary band. The vomerine band does not extend so far backwards as the maxillary band*. Tail rather longer than the body.

New Zealand, Auckland Islands, Tasmania; Timor.

a. One of the typical examples. Tasmania. Presented by Sir J. Richardson.
b. One of the typical examples. Auckland Islands. Presented by Sir J. Richardson.
c, *d*, *e*. Adult. New Zealand.
f. Adult. Australia (?). Presented by the late Earl of Derby.
g. Adult. Stuffed. South Australia.

22. Anguilla amblodon.

Günth. in Fish. Zanz. p. 125.

Origin of the dorsal fin opposite to the vent†. The length of the head is two-fifths of the distance of the gill-opening from the vent. The cleft of the mouth extends behind the small eye. Lips moderately developed. Teeth equally small, forming exceedingly broad flat bands. Tail longer than the body.

Seychelle Islands.

a. Type of the species, 43 inches long: stuffed. Prom Col. Playfair's Collection.

23. Anguilla dussumierii.

Kaup, Apod. p. 51, fig. 43.

The commencement of the dorsal fin is behind the vent. Eye in advance of the angle of the mouth. Snout rather short and blunt. Vomerine teeth extending a little further backwards than the maxillary. Total length 20·88 inches; tail 8·67 inches, to the pectoral 2·76 inches, to the dorsal 9·06 inches. (*Kaup*.)

Mahé.

5. CONGER‡.

Conger, sp., *Cuv. Règne An.*
Conger, *Kaup, Apod.* p. 111.

Scaleless. Cleft of the mouth wide, extending at least to below the middle of the eye. Maxillary and mandibulary teeth arranged in series, one of which contains teeth of equal size, and so closely set as to form a cutting-edge. No canine teeth. Vomerine band of teeth short. Pectoral and vertical fins well developed, the dorsal commencing behind the root of the pectoral. Gill-opening large, approximate to the abdomen. The posterior nostril opposite to the upper or middle part of the orbit, the anterior in a tube. Eyes well developed.

---

* This is a constant character in this species.

† The statement in the original description with regard to the position of the origin of the dorsal fin is erroneous; the example is not 2 feet, but 43 inches long.

‡ 1. Conger orbignyanus, *Valenc. in D'Orb. Voy. Am. Mérid. Poiss.* pl. 12. fig. 1; *Kaup, Apod.* p. 115.—This is probably identical with one of the species described. D'Orbigny represents the origin of the dorsal at a short distance behind the extremity of the pectoral fin, whilst this distance is increased to the entire length of the latter fin in Dr. Kaup's description.

2. Congrus fasciatus, *Richards. Ichth. Chin.* p. 312.—China.—Known from a drawing only.

3. Conger rubescens, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* 1840, p. 81, tab. 12. fig. 2.—Mediterranean.

Seas of the temperate and tropical regions.

The *skeleton* of Conger is distinguished from that of *Anguilla* by the greater development of the transverse processes of the vertebræ, especially of the caudal. The caudal vertebræ of *Anguilla* have no transverse processes.

1. **Conger marginatus.**

? Muræna tota cinerea, *Forsk.* p. 22. no. 9.
? Conger cinereus, *Rüpp. Atl. Fisch.* p. 115, pl. 29. fig. 1.
Conger marginatus, *Valenc. in Voy. Bon. Poiss.* p. 201, pl. 9. fig. 1.
—— altipinnis, *Kaup, in Wiegm. Arch.* xxii. p. 72; or *Apod.* p. 114; *Günth. in Fish. Zanz.* p. 125.
—— noordzicki, *Bleek. Act. Soc. Sc. Ind. Neerl.* ii. *Amboyna,* viii. p. 86; or *Atl. Ichth. Mur.* p. 26, pl. 23. fig. 2.

The dorsal fin begins conspicuously in advance of the extremity of the pectoral. Posterior nostril slightly below the level of the antero-posterior angle of the orbit. Upper jaw scarcely longer than the lower. The vomerine teeth reach backwards to or somewhat beyond the tip of the tongue. Greyish or blackish, vertical fins with a black edge; pectoral fin frequently with a black spot.

Vert. 51/94.

Indian Ocean and archipelago.

a–b. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c, d–e, f–g. Adult, half-grown, and young. Zanzibar.
h. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—One of the typical specimens of *C. noordzicki.*
i. Adult: skeleton. Zanzibar. Presented by Lieut.-Col. Playfair.

2. **Conger vulgaris.**

The Conger.
Κόγγρος, *Aristot.* i. c. 5; ii. c. 13, 15, 17; iii. c. 10; vi. c. 17; viii. c. 12, 13, 15; ix. c. 2.
Congre, *Bellon. De Aquat.* p. 162; *Rondel.* i. p. 308.
Broncho, *Salvian.* p. 66.
Conger, *Will. Hist. Pisc.* p. 111, tab. G. 6; *Penn. Brit. Zool.* iii. p. 130, or ed. 1812, iii. p. 196; *Yarrell, Proc. Zool. Soc.* 1831, p. 158; *Couch, Fish. Brit. Isl.* iv. p. 340, pl. 238.
Muræna, sp., *Artedi, Gen.* p. 24. no. 2; *Synon.* p. 40. no. 2.
Muræna conger, *L. Syst. Nat.* i. p. 426; *Bl.* v. p. 37, taf. 155; *Bl. Schn.* p. 487; *Lacép.* ii. p. 268; *Donov. Brit. Fish.* v. pl. 119; *Risso, Ichth. Nice,* p. 92; *Nilss. Skand. Faun.* iv. p. 680; *Gronov. Syst.* ed. *Gray,* p. 19; *Pall. Zoogr. Ross.-Ass.* iii. p. 72.
Muræna myrus, *Brünn. Pisc. Mass.* p. 12.

Anguilla conger, *Mitch. Lit. & Phil. Trans. N. York*, i. p. 360; *Shaw, Zool.* iv. 1. p. 20, pl. 1; *Turt. Brit. Faun.* p. 87; *Flem. Brit. An.* p. 200; *Jenyns, Man.* p. 478; *Kröyer, Danm. Fisk.* iii. p. 603.
Conger vulgaris, *Cuv. Règne An.*; *Yarr. Brit. Fish.* 2nd edit. ii. p. 402; 3rd edit. i. p. 68; *Parnell, Werner. Mem.* vii. p. 388; *Schleg. Faun. Japon. Poiss.* p. 259; *Bleek. Verh. Bat. Gen.* xxv. *Japan*, p. 53; or *Atl. Ichth. Mur.* p. 26, pl. 5. fig. 2.
—— niger, *Risso, Ichth. Nice*, p. 93; *Eur. Mérid.* iii. p. 201; *Kaup, Apod.* p. 113.
—— verus, *Risso, Eur. Mérid.* iii. p. 201.
Congrus vulgaris, *Richards. Voy. Ereb. & Terr. Fish.* p. 107 (the entire description bodily copied by *Kaup, Apod.* p. 111).
—— leucophæus, *Richards. l. c.* p. 108.
Conger communis, *Costa, Faun. Nap. Pesc.*
—— occidentalis, *Dekay, New York Faun. Fish.* p. 314, pl. 53. fig. 172 (bad).
? Conger verreauxi, *Kaup, Apod.* p. 115.
Osteology: *Owen, Catal. Osteol. Ser. Coll. Surg.* i. p. 15.
On Leptocephalus morrisii, *see* pp. 137, 139.

The dorsal fin begins opposite, or nearly opposite, to the extremity of the pectoral. Posterior nostril on a level with the antero-superior angle of the orbit. Jaws nearly even in front. The vomerine teeth reach backwards nearly to the tip of the tongue. Body and pectoral fin immaculate.

Vert. $\frac{56-55}{100-97}$.

Coasts of Europe, Mediterranean, St. Helena, South America, East-Indian archipelago, Japan, Tasmania.

Var. α. Body ashy grey or blackish; vertical fins with a black margin.

a. Six and a half feet long: stuffed. Old Collection.
b. Adult: skin. Scotland. From Dr. Parnell's Collection.
c. Half-grown: skin. Holland. From Gronow's Collection.
d, e. Several specimens, adult, half-grown, and young. Guernsey. Presented by Dr. A. Günther.
f. Young. Cannes. Presented by Dr. Th. Günther.
g. Half-grown. Lisbon. Presented by the Rev. R. T. Lowe.
h. Young. Algiers. Presented by Lieut.-Col. Playfair.
i. Very young. South Europe. Presented by R. B. Webb, Esq.
k. Half-grown. South America. From the Haslar Collection.
l. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
m. Half-grown. Type of *Congrus leucophæus*.
n, o–p, q–r. Adult, half-grown, and young.
s–u. Skulls.
v. Adult: skeleton. London market.—Vert. 56/93.

Var. β. Entirely uniform black.

w. Adult. St. Helena. Presented by J. C. Melliss, Esq.
x. Five feet long. Tasmania. Purchased of Hr. Schwarzschild.
y. Adult: skeleton. Tasmania. Purchased of Hr. Schwarzschild. Vert. 55/97.

Conger esculentus, Poey, Mem. Cub. ii. p. 346; and Repert. Fis.-

nat. de Cuba, ii. p. 246, is most probably identical with this species; but it is stated that the angle of the mouth extends nearly to the posterior margin of the orbit, whilst in the common Conger it scarcely reaches beyond the middle of the eye.

3. **Conger multidens.**

? Anguilla oceanica, *Mitchill, Journ. Ac. Nat. Sc. Philad.* i. p. 407.
Conger multidens, *Casteln. Anim. Amér. Sud, Poiss.* p. 84, pl. 44. fig. 1; *Kaup, Apod.* p. 114.
? Conger brasiliensis, *Kaup, Apod.* p. 115.

The dorsal fin begins the length of the pectoral behind the extremity of that fin. Uniform brown, vertical fins with a black edge.

Rio Janeiro. ? Coast of New York.

4. **Conger macrops.**

Eye very large, equal in length to the snout, and two-elevenths of the length of the head. *Lips very broad.* The posterior nostril is small, before the middle of the eye; the anterior is a small tube. Upper jaw longer than the lower; the cleft of the mouth extends to below the middle of the eye. The patch of intermaxillary teeth nearly square; vomerine teeth in a short band tapering behind. The outer series of teeth of the maxillary and mandible is composed of forty-two small, slightly truncated teeth. The length of the head is contained once and two-thirds in that of the trunk; tail longer than the body. The dorsal fin commences above the middle of the pectorals. Coloration uniform. Vertical fins with a broad black margin, which, again, is edged with white; anteriorly the dorsal fin is black for two-thirds of its depth.

Bahama Islands; Madeira.

a. Fourteen inches long. From the Haslar Collection.

An example from Madeira, 19 inches long, is in the Liverpool Museum.

Echelus caudolimbatus, Poey, Repert. Fis.-nat. Cuba, ii. p. 249 (with an outline figure of the head), does not appear to belong to *Echelus* or to the group *Myrina*, the posterior nostril being described and figured as a very small aperture situated in front of the eye, approximate to the lip. Also the lips are double. The fish would appear to belong to this group, and to be allied to *C. macrops*.

6. CONGROMURÆNA*.

Congermuræna, *Kaup, Apod.* p. 108.
Gnathophis, *Kaup, Aale Hamb. Mus.* p. 7.
Ophisoma, (*Swainson*) *Bleek. Atl. Ichth. Mur.* p. 27.

Scaleless. Bones of the front part of the head with large muciferous cavities. Cleft of the mouth narrow, not extending backwards beyond the middle of the eye. All the teeth small, fine, forming bands; those of the jaws not forming a cutting edge. Vomerine band narrow, long. Pectoral and vertical fins well developed, the dorsal beginning nearly above the gill-opening. The posterior nostril opposite to the middle of the eye, the anterior with a very short tube. Eyes large.

---

* 1. Anguilla myriaster, *Brevoort, U. S. Exped. Japan, Fish.* p. 282, pl. 11. fig. 2.—Japan.—Known from a very bad drawing only.

Tropical and subtropical seas.

1. Congromuræna balearica.

Muræna balearica, *De la Roche, Ann. Mus.* xiii. 1809, p. 327, fig. 3.
—— cassini, *Risso, Ichth. Nice*, p. 91; *Eur. Mérid.* iii. p. 203.
Conger opistophthalmus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* iv. 1840, p. 78, tab. 12. fig. 1.
—— auratus, *Costa, Faun. Nap. Pesc.* tav. 29.
? Conger balearicus, *Costa, Faun. Nap. Pesc.* tav. 34.
Conger microstomus, *Castel. An. Amér. Sud, Poiss.* p. 83, pl. 43. fig. 4.
Congermuræna balearica, *Kaup, Apod.* p. 110.
Conger impressus, *Poey, Mem. Cub.* ii. p. 318.
Ophisoma impressus, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 248.

Lips thin; the cleft of the mouth extends to below the front margin of the eye. Tail rather longer than body. Dorsal fin beginning above or immediately behind the gill-opening. Vertical fins with a narrow black margin.

Mediterranean; Atlantic coasts of Tropical America.

a–b. Adult. Malta. From the Haslar Collection.
c. Adult. From the Collection of the Zoological Society.
d. Adult. Algiers. Presented by Lieut.-Col. Playfair.

Our specimens show some variations which occur also in other Eels, but which may be mentioned here as they assist in deciding the value of characters on which species have been founded. The height of the body is one twenty-seventh of the total length in examples which are either males or individuals not sexually developed; in another, which is a female, the height of the body is only one-thirteenth of the total. The appearance of rather large depressions on the lateral line is caused by a peculiar state of preservation of the examples. The depressions are very well marked on one side of a specimen, whilst on the other the lateral line is marked by small pores only, the cavities underneath being filled with some fluid, so that no depressions are visible externally. Thus, whilst I do not hesitate to refer Poey's *C. impressus* to this species, I regard it as possible that his *Conger analis* (Mem. Cub. ii. p. 318, or *Ophisoma analis*, Repert. Cub. ii. p. 248) is also identical with it. However, he describes the cleft of the mouth as extending beyond the middle of the eye, and the lateral teeth as short and strong, so that, without further evidence, I am not yet justified in identifying it with *C. impressus*.

2. ? Congromuræna punctus.

Conger punctus, *Jenyns, Zool. Beagle, Fish.* p. 143.

The whole body, but not the head, thickly studded all over with small pores, much crowded, and appearing like pinholes. Snout short and rounded; upper jaw scarcely longer than the lower. Gape scarcely reaching beyond a vertical from the anterior part of the eye. Dorsal fin commencing above the pectorals. Tail much longer than body. Sides very regularly banded with fourteen or fifteen transverse reddish-brown fasciæ, extending on to the dorsal fin. (*Jenyns.*)

Beagle Channel (Tierra del Fuego).

Three and a quarter inches long.

3. Congromuræna anago.

Conger anago, *Schleg. Faun. Japon. Poiss.* p. 259, pl. 113. fig. 1 (2); *Bleek. Verh. Bat. Gen.* xxv. *Nalez. Japan*, p. 52.

—— anagoides, *Bleek. l. c. Mur.* p. 76, or *Nat. Tyds. Ned. Ind.* vi. p. 112.

Ophisoma anagoides, *Bleek. Atl. Ichth. Mur.* p. 27; *Kner, Novara, Fisch.* p. 375.

Congromuræna anagoides, *Bleek. l. c.* pl. 5. fig. 3.

Lips moderately developed; the cleft of the mouth extends nearly to below the middle of the eye. Tail but little longer than the body. Dorsal fin beginning above or immediately behind the gill-opening. Vertical fins with a blackish margin.

Japan; East-Indian archipelago.

a, b–c. Adult (22½ inches long) and half-grown. Japan.

d. Young. Amboyna. Purchased of Hr. Frank.

e. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *C. anagoides.*

4. Congromuræna mellissii.

Lips thin. Snout short, equal in length to the eye, which is one-fifth of the length of the head; *upper jaw but slightly projecting beyond the lower.* Anterior nostril in a very short tube; posterior nostril pore-like, opposite to the middle of the eye. *Cleft of the mouth extending nearly to below the middle of the eye.* Teeth in rather narrow bands, finely villiform; the vomerine band reaching to the vertical from the front margin of the eye. The length of the head is contained once and two-thirds in that of the trunk; *tail rather longer than the body. Dorsal fin beginning immediately in front of the gill-opening.* Greyish; vertical fins with a narrow black edge.

St. Helena.

a. Fine specimen, 17 inches long. Presented by J. C. Melliss, Esq.

5. Congromuræna habenata.

Congrus habenatus, *Richards. Ichth. Ereb. & Terr.* p. 109, pl. 50. figs. 1–5.

Congermuræna habenata, *Kaup, Apod.* p. 108, fig. 72 (copied from *Richardson*).

? Ophisoma habenatus, *Kner, Novara, Fisch.* p. 374, taf. 13. fig. 2.

Upper jaw much projecting beyond the lower. Lips moderately developed; the cleft of the mouth extends nearly to below the middle of the eye. Tail rather longer than the body. Dorsal fin beginning immediately behind the base of the pectoral. Vertical fins with a narrow black margin.

New Zealand; ? St. Paul.

a. Type of the species. Cook's Straits. Presented by the R. College of Surgeons.

b. Adult. New Zealand. Presented by Capt. Drury.

Conger neoguinaicus, Bleeker (Act. Soc. Sc. Indo-Neerl. vi. Nieuw Guinea, p. 22), or *Ophisoma neoguinaicum*, Bleek. (Atl. Ichth. Mur. p. 28), is founded on an example so badly preserved that no really distinctive characters can be pointed out. It is possible that it is identical with *C. habenata*.

a. Type of *Conger neoguinaicus*, in very bad state. New Guinea. From Dr. Bleeker's Collection.

Myrophis heterognathus, Bleeker, Act. Soc. Sc. Indo-Neerl. v. Japan, v. p. 9, pl. 3. fig. 1, is another name given by Dr. Bleeker to a young congroid fish, in bad condition, from Nagasaki. The character by which, perhaps, it may be recognized is the great length of the tail (body=2 inches, tail=3½ inches). On the other characters assigned to this fish by its original describer, Dr. Kaup has founded a new genus, *Gnathophis* (Aale Hamburg. Mus. p. 7); but Dr. Bleeker states (Atl. Ichth. Mur. p. 29) that his original description is not what it ought to have been, and that the fish is a second species of *Uroconger*. I cannot agree with him in this last conclusion, the fish having quite a different dentition; it is, in fact, a *Congromuræna*, and very closely allied to *C. habenata*.

a. Type of *Myrophis heterognathus*. Nagasaki. From Dr. Bleeker's Collection.

6. Congromuræna mystax.

Muræna mystax, *De la Roche, Ann. Mus.* xiii. 1809, p. 328, fig. 10; *Risso, Eur. Mérid.* iii. p. 203.
Congermuræna mystax, *Kaup, Apod.* p. 110.

Upper lip much swollen and thickened; upper jaw pointed, much projecting beyond the lower. Tail considerably longer than the body. Dorsal fin beginning immediately behind the gill-opening. Coloration uniform.

Mediterranean.

7. UROCONGER.

Uroconger, *Kaup, Apod.* p. 110.

Scaleless. Jaws with the muciferous cavities moderately developed. Cleft of the mouth of moderate width, extending somewhat beyond the middle of the eye. Teeth acicular, subequal in size; maxillary and lateral mandibulary teeth biserial, not closely set. Vomerine teeth small, in a single series. Pectoral and vertical fins well developed, the dorsal beginning above the root of the pectoral.

Posterior nostril a slit, situated below the level of the upper margin of the orbit; anterior nostril not tubular. Eye rather large.

East-Indian archipelago. Chinese Sea.

1. Uroconger lepturus.

Congrus lepturus, *Richards. Voy. Sulph. Fish.* p. 106, pl. 56. figs. 1–6, and *Voy. Ereb. & Terr. Fish.* p. 109; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Sumatra*, vi. p. 45.

Uroconger lepturus, *Kaup, Apod.* p. 110; *Bleek. Atl. Ichth. Mur.* p. 29, pl. 5. fig. 1; *Kner, Novara, Fisch.* p. 373.

Upper lip with large mucous openings like slits. Snout produced, depressed. Some of the intermaxillary teeth somewhat enlarged. Dorsal fin beginning above the base of the pectoral. Tail much longer than the body, tapering. Vertical fins with a black edge.

China; East-Indian archipelago.

a. Type of the species, 10½ inches long. China. Presented by J. R. Reeves, Esq.

b. Twelve inches long. China.

c. Twelve inches long. East-Indian archipelago. From Dr. Bleeker's Collection.

Fifth Group. HETEROCONGRINA.

8. HETEROCONGER.

Heteroconger, *Bleek. Versl. & Meded. Ak. Wet. Amsterd.* 1868, ii. p. 331.

Body, and especially tail, exceedingly elongate, subcylindrical, scaleless; tail compressed. Snout obtuse, very short, with the cleft of the mouth obliquely ascending upwards, the lower jaw projecting beyond the upper. Mouth small, extending to below the front margin of the eye. Teeth small, acicular, in narrow bands in the jaws and on the vomer. Nostrils very small, in front of the eye. Gill-openings lateral, narrow slits. Pectoral none. Vertical fins rather low, dorsal commencing at a short distance behind the gill-opening.

Amboyna; Canary Islands.

1. Heteroconger polyzona.

Bleek. l. c. p. 332, c. tab.

The length of the head is two-ninths of the distance between the gill-opening and the vent. Tail twice as long as the body. Eye of moderate size. Vertical fins well developed, about half as high as the body. Body light coloured, with numerous brown cross bands half as wide as the interspaces between. Some on the trunk extend across the abdomen, those on the tail only to the lateral line; they are very narrow on the head and fore part of the trunk.

Total length	10¼	inches.
Body	3½	,,
Head	⅝	inch.
Greatest depth	⅕	,,

Amboyna.

a. One of the typical specimens. From Dr. Bleeker's Collection.

2. Heteroconger longissimus.

The length of the head is one-sixth of the distance between the gill-opening and vent; tail more than twice as long as the body. Eye small. Vertical fins rather indistinct and low. Coloration uniform blackish.

Total length	19	inches.
Body	6	,,
Head	1	inch.
Greatest depth	⅕	,,

a. Lanzarote. Presented by the Rev. R. T. Lowe.

Sixth Group. MURÆNESOCINA.

9. MURÆNESOX.

Murænesox, *M'Clell. Calc. Journ. Nat. Hist.* iv. p. 408.
Cynoponticus, *Costa, Faun. Nap. Pesc.*
Murænesox *et* Brachyconger, *Bleek. Atl. Ichth. Mur.* p. 19.

Scaleless. Snout produced. Jaws with several series of small, closely set teeth; anteriorly with canines; vomer with several long series of teeth, the middle of which is formed by large, conical or compressed teeth. Gill-openings wide, approximate to the abdomen. Pectoral and vertical fins well developed, the dorsal beginning above the gill-opening. Two pairs of nostrils, the posterior opposite to the upper part or middle of the eye.

Seas of the Tropics.

1. Murænesox talabon.

Tala Bon, *Russell*, i. p. 27, pl. 38.
Conger (Muræna) talabon, *Cuv. Règne An.*; *Cant. Mal. Fish.* p. 312; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 78 (part.), and v. p. 456; and *Verh. Bat. Gen.* xxv. *Mur.* p. 18.
Murænesox lanceolata, *M'Clell. Calc. Journ. Nat. Hist.* iv. p. 409.
—— exodon, *M'Clell. l. c.*
—— serradentata, *M'Clell. l. c.*, and v. p. 210.
—— exodentata, *M'Clell.* v. p. 180, pl. 8. fig. 4, and p. 210.
—— pristis, *Kaup, Apod.* p. 116.
—— talabon, *Bleek. Atl. Ichth. Mur.* p. 22, pl. 8. fig. 2; *Kner, Novara, Fisch.* p. 372.

Vomerine teeth slender, conical, straight, widely set, none with lobes. Snout very long and narrow.

East Indies.

a. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
b. Adult: not in good state. Malayan peninsula. From Dr. Cantor's Collection.
c. Adult: skin. Malayan peninsula. From Dr. Cantor's Collection.

2. **Murænesox talabonoides.**

Muræna myrus, *Gronov. Syst.* ed. *Gray*, p. 20.
Conger talabonoides, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 20.
Murænesox talabonoides, *Bleek. Atl. Ichth. Mur.* p. 23, pl. 10. fig. 2.

Anterior vomerine teeth slender, straight, the posterior compressed, with basal lobes, the teeth of the outer mandibulary series pointing outwards. Snout very long and narrow.

Java.

a. Type of the species. Java. From Dr. Bleeker's Collection.
b. Adult: skin. From Gronow's Collection.

3. **Murænesox cinereus.**

Muræna cinerea, *Forsk. Descr. An.* pp. x and 22.
—— arabica, *Bl. Schn.* p. 488.
—— bagio, *Ham. Buch.* pp. 24, 364.
Ophisurus rostratus, *Quoy & Gaim. Voy. Uran. Zool.* p. 242, pl. 51. fig. 1.
Conger longirostris, *Benn. in Life of Raffles*, p. 692.
—— oxyrhynchus, *Eydoux & Soul. Voy. Bon.* i. p. 203, pl. 9. fig. 2.
Murænesox tricuspidata, *M'Clell. Calc. Journ. Nat. Hist.* iv. p. 409, pl. 24. fig. 1.
—— hamiltonii, *M'Clell. l. c.* v. pp. 182, 210, pl. 8. fig. 3.
—— bengalensis, *M'Clell. l. c.*
Congrus tricuspidatus, *Richards. Voy. Sulph. Fish.* p. 105, pl. 51. fig. 2 (half-grown); *Ichth. Chin.* p. 312; or *Voy. Ereb. & Terr. Fish.* p. 110.
Conger hamo, *Schleg. Faun. Japon. Poiss.* p. 262, pl. 114. fig. 2; *Richards. Voy. Ereb. & Terr. Fish.* p. 111.
—— bagio, *Cant. Mal. Fish.* p. 316; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 777; or *Verh. Bat. Gen.* xxv. *Mur.* p. 22.
Congrus protervus, *Richards. Voy. Ereb. & Terr. Fish.* p. 110.
—— angustidens, *Richards. l. c.*
—— brevicuspis, *Richards. l. c.* p. 111.
Conger singapurensis, *Bleek. Verh. Bat. Gen. Mur.* xxv. p. 21.
Murænesox bagio, *Peters, Wiegm. Arch.* 1855, p. 270; *Kaup, Apod.* p. 116, pl. 14. fig. 73; *Bleek. Atl. Ichth. Mur.* p. 24, pl. 26. fig. 2; *Kner, Novara, Fisch.* p. 373.
—— singapurensis, *Bleek. l. c.* p. 25, pl. 7. fig. 2; *Kner, l. c.* p. 373.

Vomerine teeth compressed, with a basal lobe in front and behind; the teeth of the inner series of the mandible similar in form to, and much smaller than, those of the vomer, and but rarely with basal lobes; those of the outer series rudimentary, not bent outwards.

The length of the snout and the number and form of the teeth are subject to slight individual variations; but by the characters given the species will be readily recognized.

Indian Ocean and archipelago to Japan and Australia.

a. Half-grown. India. Purchased.
b–d. Young. Vizagapatam. Presented by Capt Mitchell.
e. Half-grown. Calcutta. From the Collection of Messrs. von Schlagintweit.
f. Half-grown. Malayan peninsula. From Dr. Cantor's Collection.
g. Adult: skin. Malayan peninsula. From Dr. Cantor's Collection.
h, i. Adult. East-Indian archipelago.
k. Adult. East-Indian archipelago. From Dr. Bleeker's Collection as *M. singapurensis*.
l. Half-grown. Philippine Islands. Purchased of Mr. Cuming.
m. Young. Formosa. From Mr. Swinhoe's Collection.
n. Half-grown. Amoy. From Mr. Swinhoe's Collection.
o. Half-grown. China. Presented by J. R. Reeves,[a] Esq.—Type of *C. brevicuspis*, Rich.
p. Half-grown. China.—Type of *C. tricuspidatus*, Rich.
q. Adult: stuffed. China. Presented by J. R. Reeves, Esq.—Type of *C. angustidens*, Rich.
r–t. Adult and half-grown. Japan. Purchased.
u. Skin, 57 inches long. Australia. Purchased.
v. Adult: head. Type of *C. protervus*, Rich.
w. Adult: skeleton. Japan. Purchased.

The *skeleton* shows several peculiarities. The structure of the skull is very solid; the frontal bones are swollen, forming a thick porous mass on each side of the skull; a very distinct crest along the median line of the skull; the prefrontals, ethmoid, and intermaxillaries are coalesced into a long narrow bone without any sutures. The transverse processes of the abdominal vertebræ are split into two to the base, a long slender rib being attached to the anterior part of each process. A second series of long accessory ribs along each side of the vertebral column; each of these ribs arises with two branches, one from the centre, and the other from the transverse process of the vertebra. Vert. 67/87.

4. **Murænesox savanna.**

Muræna savanna, *Cuv. Règne An.* (name only).
Conger savanna, *Benn. Proc. Comm. Zool. Soc.* 1831, p. 135.
—— brasiliensis, *Ranzani, Nov. Comm. Ac. Sc. Instit. Bonon.* iv. 1840, p. 79, tab. 13. fig. 1.
Cynoponticus ferox, *Costa, l. c.* tav. 28.
Congrus curvidens, *Richards. Voy. Ereb. & Terr. Fish.* p. 111, cop. by *Kaup, Apod.* p. 117.
Conger limbatus, *Casteln. An. Amér. Sud*, p. 83, pl. 43. fig. 3.
Murænesox savanna, *Kaup, Apod.* p. 117, fig. 74.
Brachyconger savanna, *Bleek. Ned. Tyds. Dierk.* ii. p. 233.

Vomerine teeth compressed, with basal lobes; maxillary and mandibulary teeth obtuse, more or less molar-like. Snout not much elongate.

Atlantic coasts of Tropical America; found once in the Mediterranean.

a. Large specimen. Jamaica. From Dr. Bancroft's Collection. Type of the species.
b. Adult: stuffed. West Indies. Type of *Congrus curvidens.*

10. NETTASTOMA.

Nettastoma, *Rafinesque.*

Scaleless. Snout much produced, depressed. Jaws and vomer with bands of cardiform teeth, those along the median line of the vomer being somewhat the larger. Vertical fins well developed, pectorals none. Gill-openings of moderate width, open. Nostrils on the upper surface of the head, valvular; the anterior near to the end of the snout, the posterior above the anterior angle of the eye. Air-bladder present; pyloric appendages none.

Mediterranean.

1. Nettastoma melanurum.

Nettastoma melanura, *Rafinesque*; *Kaup, Apod.* p. 119, fig. 75.
Murænophis saga, *Risso, Ichth. Nice,* p. 370, pl. 10. fig. 39, or *Eur. Mérid.* iii. p. 193.
On Hyoprorus messinensis, *see* p. 144.

The upper jaw is the longer. Cleft of the mouth extending to below the hind margin of the eye. Dorsal fin commencing immediately behind the gill-opening; tail long, tapering into a point, nearly twice as long as the body. Fins with a black margin posteriorly. Peritoneum black.

Mediterranean.

a, b. Adult. Nice.

11. SAURENCHELYS.

Saurenchelys, *Peters, Monatsber. Ak. Wiss. Berl.* 1864, p. 397.

Scaleless. Snout much produced. Jaws, vomer, and palatine bones with several series of small pointed teeth, those along the median line of the vomer being somewhat the larger. Vertical fins well developed, pectorals none. Nostrils lateral; the anterior near to the end of the snout, the posterior in front of the eye.

Air-bladder and pyloric appendages absent.

Mediterranean?

1. Saurenchelys cancrivora.

Peters, l. c.

Very similar to *Nettastoma*; tail tapering into a point. Gill-opening one-fifth more distant from vent than from the end of the snout. Eye one-third of the length of the snout. Dorsal fin commencing immediately behind the gill-opening. Upper jaw the longer. Vertical fins with a black margin posteriorly. Peritoneum silvery. (*Ptrs.*)

12. OXYCONGER.

Oxyconger, *Bleek. Atl. Ichth. Mur.* p. 19.

Scaleless. Snout much produced; maxillary and mandibulary teeth triserial, the middle series containing long canine teeth placed at some distance from one another; vomer with a series of very small teeth. Pectoral and vertical fins well developed, the dorsal beginning above the gill-opening. Posterior nostrils in front of the eye, anterior tubular.

Japan.

1. Oxyconger leptognathus.

Conger leptognathus, *Bleek. Act. Soc. Sc. Indo-Nederl.* iii. *Japan*, iv. p. 27.

Cleft of the mouth three-fifths of the length of the head; tail shorter than body.

Nagasaki.

a. Type of the species: in bad state. From Dr. Bleeker's Collection.

13. HOPLUNNIS.

Hoplunnis, *Kaup, Aale Hamburg. Mus.* p. 19.

Scaleless. Snout much produced; maxillary and mandibulary teeth biserial; vomerine teeth long, pointed, in a single series. Pectoral and vertical fins, the dorsal commencing above the gill-opening. Gill-opening small. Posterior nostril in front of the eye. Tail several times longer than body.

Central America.

1. Hoplunnis schmidtii.

Kaup, l. c. p. 20, taf. 2. fig. 4.

Tail about four times as long as the body; snout thrice as long as the eye. The posterior portion of the vertical fin black. (*Kaup.*)

Puerto Cabello.

14. NEOCONGER.

Neoconger, *Girard, U. S. & Mex. Bound. Ichth.* p. 77.

Body naked. Pectorals present. Dorsal and anal fins rudimentary, more developed towards the end of the tail. Maxillary teeth in several series, vomerine teeth uniserial. Cleft of the mouth extending behind the small eye. Posterior nostril near the anterior rim of the orbit.

Coast of Texas.

1. Neoconger mucronatus.

Girard, l. c.

Head small, narrow, pointed, the upper jaw projecting beyond the lower. Tail not much longer than body. Dorsal fin beginning somewhat in advance of the vent. Coloration uniform. (*Girard.*)

St. Joseph Island.

Seventh Group. MYRINA.

15. MYRUS.

Myrus, *Kaup, Apod.* p. 31.

Nostrils on, or very close to. the margin of the upper lip; the anterior tubular, the posterior lobed. Vertical and pectoral fins well developed; the dorsal commencing behind the gill-opening; caudal rays very short. Teeth cardiform, subequal in size, forming bands.

Mediterranean.

1. Myrus vulgaris.

? Μύρος, *Aristot.* v. c. 10.
Myrus, *Rondel.* p. 407.
Serpens marinus alter, *Willughby*, p. 108.
Muræna, sp., *Artedi, Synon.* p. 40. no. 3, and *Genera*, p. 24. no. 3.
Muræna myrus, *L. Syst. Nat.* i. p. 426; *Lacép.* ii. p. 265; *Bl. Schn.* p. 488; *Risso, Ichth. Nice*, p. 90.
Conger myrus, *Cuv. Règne An.*; *Risso, Eur. Mérid.* iii. p. 202; *Costa, Faun. Nap. Pesc.*
Anguilla myrus, *Shaw, Zool.* iv. 1. p. 24; *Jenyns, Man.* p. 478.
Congrus myrus, *Richards. Voy. Ereb. & Terr. Fish.* p. 108.
Myrus vulgaris, *Kaup, Apod.* p. 31, fig. 14 (cop. *Richardson*).

The cleft of the mouth extends to below the hind margin of the eye. Dorsal fin commencing above the end of the pectoral. Tail twice as long as the trunk (without head). A white line across the occiput, joining another running over the root of the pectorals. White pores symmetrically arranged on the snout, nape, and along the lateral line. Vertical fins with a black edge.

Mediterranean.

a, b, c. Adult. Mediterranean.
d. Half-grown. Algiers. Presented by Lieut.-Col. Playfair.

2. Myrus uropterus.

Conger uropterus, *Schleg. Faun. Japon. Poiss.* p. 261.
Ophisurus uropterus, *Bleek. Act. Soc. Sc. Indo-Nederl.* iii. *Japan*, iv. p. 28; and v. *Japan*, v. pl. 1. fig. 1.

The cleft of the mouth extends nearly to below the hind margin of the eye. Dorsal fin commencing above the end of the pectoral. Tail twice as long as the trunk (without head). The front margin of the eye is conspicuously nearer to the end of the maxillary than to the extremity of the snout. Coloration uniform.

Japan.

a. Seventeen inches long. From Dr. Bleeker's Collection.

16. MYROPHIS.

Myrophis, *Lütken, Vidensk. Meddel. naturh. Foren. Kjöbenh.* 1851, no. 1; or *Wiegm. Arch.* 1852, p. 270.

Nostrils on the margin of the upper lip, the anterior tubular. Pectoral fins well developed; vertical fins low, surrounding the tail; the dorsal commencing far behind the pectoral. Teeth bi- or triserial, uniserial on the hinder part of the vomer.

West Africa, West Indies, Panama.

1. Myrophis punctatus.

Muræna myrus, *Lacép.* ii. pl. 3. fig. 3 (not descr.).

Muræna longicollis, *Cuv. Règne An.* (name only).
Myrophis punctatus, *Lütken, l. c.*
—— longicollis, *Kaup, Apod.* p. 30; *Peters, Monatsber. Ak. Wiss. Berl.* 1864, p. 397.

Tail more than twice as long as the trunk (without head). Eye small. Gill-opening rather nearer to the end of the snout than to the origin of the dorsal. Cleft of the mouth extending behind the eye; upper jaw the longer. Coloration uniform.

West Africa, West Indies, Panama.

a. Panama. From Capt. Dow's Collection.

Myrophis microstigmius, Poey, Repert. Fis.-nat. ii. p. 250, from Cuba, would appear to differ from *M. punctatus* only in the more backward situation of the origin of the dorsal fin, which is said to be midway between the gill-opening and the vent, whilst in the specimens of *M. punctatus* examined by me the origin of that fin is distinctly nearer to the gill-opening than to the vent.

17. PARAMYRUS.

Nostrils on the margin of the upper lip. Vertical and pectoral fins well developed, the dorsal commencing behind the gill-opening. Teeth in the jaws biserial.

Brazil, West and East Indies.

1. Paramyrus cylindroideus.

Conger cylindroideus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* 1840, p. 80, pl. 13. fig. 2.

("In utroque latere labii superioris tubi duo breves, sed latiusculi; horum anterior acutus appendice filiformi.") Upper jaw longer than the lower; cleft of the mouth extending behind the eye, which is of moderate size. The dorsal fin commences nearly above the middle of the pectoral. Tail twice as long as the body (with the head). Vertical fins with a narrow black edge. (*Ranz.*)

Brazil.

2. Paramyrus microchir.

Echelus microchir, *Bleek. Ned. Tyds. Dierk.* ii. p. 40; or *Atl. Ichth. Mur.* p. 30, pl. 45. fig. 4.

Cleft of the mouth extending to below the hind margin of the eye. Upper jaw projecting beyond the lower. Teeth subequal in size, small, uniserial on the vomer and the side of the mandible. Tail nearly twice as long as the body. Dorsal fin commencing above the extremity of the pectoral. Uniformly coloured. Hinder part of the anal fin with black margin.

Celebes.

a. Type of the species. From Dr. Bleeker's Collection.

18. CHILORHINUS.

Chilorhinus, *Lütken, Vid. Meddel. naturh. Foren. Kjöbenh.* 1851, no. 1; or *Wiegm. Arch.* 1852, p. 272.

Body short, much compressed. Nostrils on the margin of the upper lip. Pectorals nearly invisible. Vertical fins well developed, dorsal commencing somewhat behind the gill-opening.

West Indies.

1. **Chilorhinus suensonii.**

Lütken, l. c.

Snout short, obtuse, depressed; cleft of the mouth narrow. Tail somewhat longer than the body. (*Ltk.*)

St. Croix.

19. MURÆNICHTHYS.

Murænichthys, *Bleek. Verh. Bat. Gen.* xxv. 1853, *Mur.* p. 71.

Body long, cylindrical, vermiform. Nostrils on the margin of the upper lip. Pectoral fins none. Dorsal fin low, or rudimentary, commencing at a great distance behind the gill-opening. Gill-opening narrow. Eyes small.

East-Indian archipelago.

1. **Murænichthys macropterus.**

Bleek. Act. Soc. Sc. Indo-Nederl. ii. *Amboyna,* viii. p. 91; or *Atl. Ichth. Mur.* p. 31, pl. 7. fig. 3.

Origin of the dorsal fin nearer to the gill-opening than to the vent. Snout pointed, the greater part of the teeth biserial. The cleft of the mouth extends somewhat behind the eye.

Amboyna, Solor.

a. Type of the species, nine inches long. Amboyna. From Dr. Bleeker's Collection.

b. Fourteen inches long. Presented by the Royal College of Surgeons.

2. **Murænichthys gymnopterus.**

Muræna gymnopterus, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 52.

Murænichthys gymnopterus, *Bleek. l. c.* p. 71; or *Nat. Tyds. Ned. Ind.* iv. p. 506; or *Atl. Ichth. Mur.* p. 32, pl. 6. fig. 1.

—— microstomus, *Bleek. Ned. Tyds. Dierk.* ii. p. 39; or *Atl. Ichth. Mur.* p. 32, pl. 6. fig. 2 (mouth too small).

Origin of the dorsal fin far in advance of the vent, and nearer to it than to the gill-opening. Snout obtuse. Teeth obtuse, forming bands. The cleft of the mouth extends considerably behind the eye.

Java, Celebes, Batu.

a. Type of *M. gymnopterus.* From Dr. Bleeker's Collection.

b. Type of *M. microstomus.* Makassar. From Dr. Bleeker's Collection.—In this specimen the cleft of the mouth is of the same width as in the other.

3. **Murænichthys schultzii.**

Bleek. Nat. Tyds. Ned. Ind. xiii. p. 366; or *Atl. Ichth. Mur.* p. 33, pl. 4. fig. 3.

Body short. Origin of the dorsal fin nearly opposite to the vent.

Snout obtuse; the greater part of the teeth biserial. Cleft of the mouth extending considerably beyond the eye.

Java.

a. Type of the species, $3\frac{1}{2}$ inches long. From Dr. Bleeker's Collection.

4. Murænichthys gymnotus.

Bleek. Act. Soc. Sc. Indo-Nederl. ii. *Amboina,* viii. p. 90; or *Atl. Ichth. Mur.* p. 33, pl. 6. fig. 3.

Body rather slender. Dorsal fin rudimentary, its origin being apparently opposite to the vent. Snout produced, pointed. Vomerine teeth uni-, the others pluriserial. Cleft of the mouth extending somewhat behind the eye.

Amboyna.

a. Type of the species, 6 inches long. From Dr. Bleeker's Collection.

5. Murænichthys moorii.

Body very slender. The length of the head is two-sevenths of the distance between the gill-opening and vent. Tail but little longer than the body. Vertical fins low, the dorsal commencing opposite to the vent. Snout rather obtuse, not quite twice as long as the eye. Vomerine and anterior mandibulary teeth biserial, the remainder uniserial. Cleft of the mouth extending somewhat behind the eye.

Hab. —— ?

a. Adult female, with mature ova, 190 millims. long, the depth at the vent being 5 millims.—Three other examples are in the Liverpool Museum, the Curator of which, Mr. Thomas Moore, kindly lent them to me for examination.

6. Murænichthys vermiformis.

Chilorhinus (Murænichthys) vermiformis, *Peters, Monatsber. Ak. Wiss. Berl.* 1866, p. 524.

Origin of the dorsal fin conspicuously behind the vent. Angle of the mouth a little behind the eye. Teeth of the jaws and vomer uniserial. (*Peters.*)

Ceylon.

7. Murænichthys macrostomus.

Bleek. Ned. Tyds. Dierk. ii. p. 38; or *Atl. Ichth. Mur.* p. 33, pl. 41. fig. 1.

Dorsal fin rudimentary, traces of its origin being visible near to the vent. Snout acutely pointed. Cleft of the mouth very wide, the small eye being above the second fifth of its length. Teeth in the jaws pointed, recurved, uniserial.

Amboyna.

Type of the species. From Dr. Bleeker's Collection.

Eighth Group. OPHICHTHYINA.

20. LIURANUS.

Leiuranus, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 36.
Stethopterus, *Bleek. l. c.*

Body cylindrical. Teeth pointed, of moderate size; those of the intermaxillary in a double series, the others uniserial; vomerine teeth absent. Snout pointed, much projecting beyond the mouth, which is rather narrow, not extending beyond the hind margin of the orbit. Eye small. Dorsal and anal fins low; the former commencing a short distance behind the gill-opening; pectoral very small. Extremity of the tail free.

Indian and Pacific Oceans.

1. Liuranus semicinctus.

Ophisurus semicinctus, *Bennett, in Beechey's Voy.* p. 66, tab. 20. fig. 4.
Ophisurus? (Sphagebranchus?) vimineus, *Richards. Voy. Sulph. Fish.* p. 107, tab. 52. figs. 16–20 (young).
Ophisurus vimineus, *Richards. Fish. Chin.* p. 314; *Voy. Ereb. & Terr. Fish.* p. 106.
Leiuranus lacepedii, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 36.
Stethopterus vimineus, *Bleek. l. c.* pp. 24, 36.
Leiuranus colubrinus, *Kaup, Apod.* p. 2 (synon. part.); *Bleek. Atl. Ichthyol. Muræn.* p. 42, pl. 19. fig. 1 (synon. part.); *Kner, Novara, Fisch.* p. 378.

The length of the head (to the gill-opening) is contained six times and a half in the distance of the gill-opening from the vent. Tail shorter than or as long as the body. The entire fish with from 25 to 35 broad brown bands, which do not extend across the abdomen.

Indian and Pacific Oceans.

a. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
b. Half-grown. Feejee Islands. Voyage of the 'Herald.'
c. Young. China. Presented by Sir J. Richardson.—Type of *Ophisurus vimineus*.

21. OPHICHTHYS.

Ophichthys, sp., *Ahl, Specim. Ichthyol.* 1789, p. 9.
Ophisurus, Pœcilocephalus *et* Cæcilia, *Lacép.*
Cœcula, *Vahl, Skrivt. Naturh. Selsk.* iii. 1794, p. 149.
Sphagebranchus, *Bl. Schn.*
Muræenopsis, *Lesueur.*
Apterichthys, *Duméril, Ichth. Anal.* p. 205.
Leptorhynchus, *Smith, Ill. Zool. S. Afr. Pisc.*
Ichthyapus, *Bris. de Barneville, Rev. Zool.* 1847, p. 219.
Centrurophis, Pœcilocephalus, Microdonophis, Cœcilophis, Ophisurus, Herpetoichthys, Brachysomophis, Elapsopis, Mystriophis, Murænopsis, Echiopsis, Scytalophis, Leptorhinophis, Pisoodonophis, Lamnostoma, Anguisurus, Sphagebranchus, Cirrhimuræna, Callechelys, Ichthyapus, Ophisuraphis, Crotalopsis, *Kaup.*
Leptognathus (*Swains.*), Achirophichthys, &c., *Bleeker.*
Macrodonophis, Uranichthys, &c., *Poey, Repert. Fis.-nat. Cuba,* ii. pp. 251, 256.

Extremity of the tail free. Teeth on the vomer as well as in the jaws.

We arrange the species of this genus thus:—

- I. Teeth pointed; pectoral fin developed in adult examples (see *O. crocodilinus*)*.
  - A. Maxillary teeth in a double series.
    - 1. Mandibulary teeth in a double series.
      - *a.* Canine teeth very distinct, p. 56.
      - *b.* The teeth of each series are equal or subequal in size.
        - *α.* Cleft of the mouth wide, more than one-third of the length of the head, p. 58.
        - *β.* Cleft of the mouth of moderate width, less than one-third of the length of the head, p. 59.
    - 2. Mandibulary teeth uniserial.
      - *a.* Lips fringed (*Brachysomophis*), p. 64.
      - *b.* Lips not fringed.
        - *α.* Snout much produced; large canine teeth (*Leptognathus*), p. 65.
        - *β.* Snout moderately produced; no large canine teeth (*Herpetoichthys*), p. 66.
  - B. Maxillary teeth uniserial.
    - 1. Dorsal fin commencing behind the root of the pectoral, p. 69.
    - 2. Dorsal fin commencing above or nearly above the gill-opening, p. 73.
    - 3. Dorsal fin commencing in advance of the gill-opening, p. 74.
  - C. Maxillary teeth equally small, forming bands; lips fringed (*Cirrhimuræna*), p. 75.
  - D. Maxillary teeth tri- or quadriserial; lips not fringed, p. 76.
- II. Teeth granular (*Pisodontophis*).
  - A. Pectoral developed; dorsal commencing behind the base of pectoral, p. 77.
  - B. Pectoral developed; dorsal commencing in advance of the gill-opening, p. 80.
  - C. Pectoral rudimentary; dorsal commencing in advance of the gill-opening, p. 81.
- III. Teeth equally small, conical; pectoral absent (rarely rudimentary); gill-openings close together (*Sphagebranchus*†).
  - A. The dorsal commences at some distance behind the gill-opening, p. 84.
  - B. The dorsal commences above or nearly above the gill-opening, p. 86.

---

* 1. Ophichthys brachyurus, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 426.—Cuba.

2. Pisoodonophis magnifica, *Abbott, Proc. Ac. Nat. Sc. Philad.* 1860, p. 476.—Sandwich Islands.

3. Ophiurus californiensis, *Garrett, Proc. Calif. Ac. Nat. Sc.* iii. p. 66.—Allied to *O. grandimaculatus*.

† 1. Sphagebranchus rostratus, *Bl.* ix. p. 88, tab. 419. fig. 2; *Bl. Schn.* p. 535, tab. 103. fig. 2; *Kaup, Abhandl. ntrwiss. Verein. Hamburg*, iv. 2, 1860, p. 15.—Surinam.

2. Sphagebranchus (?) cephalopeltis, *Bleek. Verh. Holl. Maatsch. Haarlem*, 1862, *Guinée*, p. 128.—Coast of Guinea.

C. The dorsal commences conspicuously in advance of the gill-opening, p. 87.

D. Dorsal and anal fins absent, p. 89.

I. *Teeth pointed; pectoral fin developed in adult examples.*

A. *Maxillary teeth in a double series.*

1. *Mandibulary teeth in a double series.*

a. *Canine teeth very distinct.*

1. Ophichthys rostellatus.

Ophisurus rostellatus, *Richards. Ichthyol. Ereb. & Terr.* p. 105.
—— porphyreus, *Schleg. Faun. Japon. Poiss.* p. 265, pl. 116. fig. 1.
Mystriophis rostellatus, *Kaup, Apod.* p. 10.
—— porphyrus, *Kaup, Apod.* p. 11.

The length of the head is nearly one-third of the distance between the gill-opening and vent. Snout produced, somewhat flattened, contracted behind the extremity, like the snout of a Crocodile. Eye of moderate size, two-fifths or one-third of the length of the snout, situated in the anterior fourth of the length of the head. Teeth pointed, fixed, *unequal in size*; those of the intermaxillary are canine teeth forming a transverse series; maxillary and mandibulary teeth biserial, those of the outer series are distant and canine teeth; vomerine teeth canines and uniserial. Gill-openings wide and close together. Vertical fins moderately developed. Origin of the dorsal fin immediately behind the extremity of the pectoral, which is well developed, about one-fourth of the length of the head. Tail one-fourth longer than the body. Upper parts brown.

West Africa; Japan.

a. Type of the species. Senegal. Presented by the late Earl of Derby.
b. Adult: dried. Gambia. Purchased of Mr. Whitely.
c. Thirty-nine inches long. Japan. Purchased of Hr. Frank.
d. Half-grown.

2. Ophichthys punctifer.

Crotalopsis punctifer, *Kaup, Abhandl. Ntrwiss. Verein. Hamburg*, iv. 2, 1860 (1859), p. 12, taf. 1. fig. 3 (not good).
Conger mordax, *Poey, Mem. Cuba*, ii. 1860, p. 319.
Macrodonophis mordax, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 252, tab. 2. fig. 9 (head).

Snout narrowed, short, spoon-shaped, twice as long as the eye; cleft of the mouth very wide. Teeth pointed, fixed, *unequal in size*; those of the intermaxillary in a single arched series, the foremost being the longest of all teeth; maxillary and mandibulary teeth in a double series, the outer containing canine teeth; *vomerine teeth triserial*, rather small. Lips *not fringed*. Gill-openings wide. The origin of the dorsal fin is at some distance behind the pectoral *, which is well developed. Tail somewhat longer than the body. Brownish, with numerous small roundish or ovate black spots.

---

* This as well as other important characters are not attended to in Kaup's description or figure.

Puerto Cabello; Cuba.

3. Ophichthys adspersus.

The length of the head is contained twice and two-thirds in the distance between the gill-opening and vent. Snout short, depressed, with the jaws even in front. Eye of moderate size, two-thirds of the length of the snout, situated in the anterior fifth of the length of the head. Cleft of the mouth very wide, one-half of the length of the head; lips not fringed. Teeth pointed, fixed, unequal in size; those of the intermaxillary stand in an arched series, behind which a large canine tooth; the other teeth biserial, the outer series of the maxillary and mandible containing canine teeth. Gill-openings of moderate width, close together. Vertical fins moderately developed; the distance between the origin of the dorsal fin and gill-opening is about two-fifths of the length of the head; pectoral fin one-fourth of the length of the head. Tail longer than the body. Body with numerous blackish-brown specks.

China.

a. Eighteen inches long.

4. Ophichthys intertinctus.

Ophisurus intertinctus, *Richards. Ereb. & Terr. Fish.* p. 102.
Echiopsis intertinctus, *Kaup, Apod.* p. 13.

Two series of large ovate brown spots along each side of the body, one above, the other below the lateral line; the spots of the lower series are less in number, and placed alternately with the spots of the upper series; upperside of the head with small brown spots; dorsal fin with an interrupted brown margin; anal fin with a brown edge. Gill-openings wide, more nearly approaching to each other than is usual in this genus. The length of the head is two-sevenths of the distance of the gill-opening from the vent. Cleft of the mouth very wide, nearly one-half of the length of the head. Teeth sharply pointed, with canines; posterior part of the maxillary teeth and the mandibulary teeth in a double series, some of the anterior and lateral teeth being canines; the teeth of the inner maxillary series are depressible. Intermaxillary with some smaller teeth in front in a transverse series, and with a large canine tooth behind the series. Vomer with a double series, confluent into one posteriorly. Eye small, two-thirds of the length of the pointed snout, and situated in the anterior fifth of the length of the head. The length of the pectoral fin is one-fifth of that of the head. Dorsal commencing at a short distance behind the end of the pectoral. Tail rather longer than the body.

West Indies.

a. Type of the species, 12½ inches long. Purchased of Mr. Scrivener.
b. Sixteen inches long.

b. *The teeth of each series are equal or subequal in size.*

a. *Cleft of the mouth wide, more than one-third of the length of the head.*

5. **Ophichthys triserialis.**

Muræenopsis triserialis, *Kaup, Apod.* p. 12.
? Herpetoichthys callisoma, *Abbott, Proc. Ac. Nat. Sc. Philad.* 1860, p. 475.

A series of large, transversely ovate brown spots along the back, alternating with another series of similar round spots running along each side of the body; abdomen sometimes with one or two series of smaller brown spots. Head with small black spots; an irregular black band across the occipital region. Dorsal fin with a black margin; anal fin with black submarginal spots. Head with numerous longitudinal rugæ. The length of the head is two-fifths or one-third of the distance of the gill-opening from the vent. Cleft of the mouth wide, more than one-third of the length of the head. Eye of moderate size, its diameter being contained once and two-thirds in the length of the snout; it is situated in the anterior third of the length of the head. Teeth pointed, fixed, all biserial, except those on the vomer, which are uniserial. *Pectoral fin two-sevenths of the length of the head; dorsal fin commencing above the terminal portion of the pectoral.* Tail rather longer than the body.

Atlantic and Pacific coasts of Tropical America.

a. Type of the species, 36 inches long. Pacific. Collected by Dr. Goodridge.
b. Large specimen. Caribbean Sea. Collected by Mr. Guilding.
c. Adult, 42 inches long. Bahia. Collected by Dr. Wucherer.
d. Half-grown. From the Haslar Collection.

6. **Ophichthys grandimaculata.**

Ophichthys grandimaculata, *Kner & Steindachner, Sitzgsber. Ak. Wiss. Wien,* 1866, liv. p. 389, fig. 13.

Back with broad blackish cross bands extending downwards to below the lateral line, and alternating with large round dorsal spots extending to the lateral line only; head with small round blackish spots. Dorsal fin with a broad blackish margin; anal blackish. The length of the head is two-fifths of the distance of the gill-opening from the vent. Cleft of the mouth wide, more than one-third of the length of the head. Eye of moderate size, its diameter being contained once and two-thirds in the length of the snout; it is situated in the anterior third of the length of the head. Teeth pointed, fixed, all biserial except those on the vomer, which are uniserial. *The length of the pectoral fin is more than one-third of that of the head, dorsal fin commencing above the basal half of the pectoral.* Tail longer than body.

Peru.

a. One of the typical specimens, 24 inches long. From the Godeffroy Museum.

7. Ophichthys parilis.

Ophisurus parilis, *Richards. Ereb. & Terr. Fish.* p. 105.
Scytalophis parilis, *Kaup, Apod.* p. 14, fig. 8.
Ophichthys macrurus, *Poey, Repert. Fis.-nat. Cuba,* ii. p. 256.

Gill-openings not very wide, but approaching nearer to each other than is usual in this genus. Coloration uniform. The length of the head is one-half of the distance of the gill-opening from the vent. Cleft of the mouth rather wide, its length contained twice and two-thirds in that of the head. Eye small, two-fifths of the length of the snout. Anterior nostril with an elongate tapering tube. Teeth pointed, fixed, in all the bones biserial, the anterior rather stouter than the others. The length of the pectoral fin is contained twice and one-fourth in that of the head; dorsal fin rather low, commencing above the posterior third of the pectoral. Tail twice as long as the body.

West Indies, Bahia.

a. Type of the species, 19 inches long. Cuba. Purchased of Mr. Scrivener.
b. Adult. Bahia.

8. Ophichthys dicellurus.

Ophisurus dicellurus, *Richardson, Voy. Sulph. Ichthyol.* p. 106, pl. 48. figs. 2–4; *Voy. Ereb. & Terr. Fish.* p. 105.

Gill-openings wide, approaching nearer to each other beneath than is usual in this genus. The length of the head is one-half of the distance of the gill-opening from the vent. Upper jaw slightly projecting beyond the lower; cleft of the mouth rather wide, two-fifths of the length of the head. Eye of moderate size, two-thirds of the length of the snout, and situated in the anterior third of the length of the head. Teeth pointed, fixed; intermaxillary teeth? vomerine teeth in a single, maxillary in a double series; anterior mandibulary teeth in a double row, the remainder being single. Pectoral fins two-fifths as long as the head; dorsal fin rather low, commencing above the extremity of the pectoral. Body one-third shorter than the tail. Coloration?

China.

a. Type of the species, 10 inches long. Yang-tze-kiang. Presented by Sir J. Richardson.

β. Cleft of the mouth of moderate width, less than one-third of the length of the head.

9. Ophichthys magnoculus.

Scytalophis magnioculis, *Kaup, Apod.* p. 13. fig. 7 (not 8).
Ophichthys magnioculis, *Kner, Novara, Fisch.* p. 376.

Coloration uniform. The length of the head is rather more than one-half of the distance of the gill-opening from the vent. Eye of moderate size, two-thirds of the length of the snout; tube of the anterior nostril not elongate. Teeth pointed, fixed, biserial in all the bones. The length of the pectoral fin is one-third of that of the head, the dorsal fin commencing above the posterior third of the pectoral. Tail twice as long as the body. (*Kaup.*)

Brazil; St. Croix.

10. **Ophichthys gomesii.**

Ophisurus gomesii, *Casteln. Anim. Amér. Sud, Poiss.* p. 84, pl. 44. fig. 2.

Leptorhinophis gomesii, *Kaup, Apod.* p. 14.

Coloration uniform; vertical fins with a black edge. The length of the head is one-third of the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, extending behind the eye. Teeth pointed, biserial in all the bones. The length of the pectoral fin is rather more than one-third of that of the head. *Dorsal fin commencing above the end of the pectoral.* Tail not quite twice as long as the body.

Rio Janeiro.

Ophisurus chrysops, Poey, Mem. Cub. ii. p. 320, and Repert. Fis.-nat. Cub. ii. p. 255, from Cuba, may prove to be identical with this species.

11. **Ophichthys pauciporus.**

Poey, Repert. Fis.-nat. Cuba, ii. p. 255, lam. 3. fig. 5 (head).

Coloration uniform; vertical fins with a black edge. The length of the head is contained thrice and one-third in the distance of the gill-opening from the vent. Cleft of the mouth less than one-third of the length of the head. Eye of moderate size, one-half of the length of the snout. Teeth in the jaws biserial. Pectoral fin well developed; *dorsal fin commencing at a considerable distance behind the extremity of the pectoral.* Body two-thirds of the length of the tail. (*Poey.*)

Cuba.

12. **Ophichthys puncticeps.**

Cryptopterus puncticeps, *Kaup, Aale d. Hamburg. Mus.* p. 11, taf. 1. fig. 2.

The dorsal and anal fins disappear for some distance before their termination near the end of the tail. Coloration uniform. All the teeth small; those of the maxillary biserial, of the vomer uniserial; mandible with one series of teeth, and with a few others in front forming a second series. Eye of moderate size; cleft of the mouth of moderate width. Pectoral fin well developed; dorsal commencing at a short distance behind the end of the pectoral. Length of the body rather more than two-thirds of that of the tail. (*Kaup.*)

Puerto Cabello.

13. **Ophichthys hyala.**

Ophisurus hyala, *Ham. Buch. Fish. Gang.* pp. 20, 363, tab. 5. fig. 5; *M'Clell. Calc. Journ. Nat. Hist.* v. p. 211; *Richards. Voy. Ereb. &*

Terr. Fish. p. 102; *Bleek. Verh. Bat. Gen. Muræn.* xxv. *Beng. & Hind.* p. 158.
Ophisurus rostratus, *M'Clell. l. c.* pp. 184, 211.
—— minimus, *M'Clell. l. c.* pp. 185, 212, tab. 10. fig. 3; *Bleek. l. c. Muræn.* p. 25.
Ophiurus hyala, *Cant. Mal. Fish.* p. 325.

Coloration uniform. The length of the head is two-sevenths of the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, slightly extending behind the orbit, one-fourth of the length of the head. Snout pointed; eye small. Teeth pointed, fixed; intermaxillary teeth stoutest, and, like the other teeth, biserial, except the posterior mandibulary teeth, which stand in a single series. Length of the pectoral one-fourth of that of the head; dorsal commencing at a short distance behind the extremity of the pectoral. Length of the body two-thirds of that of the tail.

Bengal.

a. Fourteen and a half inches long.

b. Numerous young specimens. From the Collection of the East-India Company.

14. **Ophichthys pallens.**

Ophisurus harancha, *Richards. Ichth. Chin.* p. 313 (not *H. B.*).
—— pallens, *Richards. Voy. Ereb. & Terr. Fish.* p. 101.
Pisoodonophis pallens, *Kaup, Apod.* p. 17.

Scarcely distinct from *O. hyala*.

Coloration uniform. The length of the head is nearly one-fourth of the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, slightly extending behind the orbit, two-ninths of the length of the head. Snout pointed; eye rather small. Teeth pointed, fixed, biserial, except the vomerine teeth, which stand in a triple series; intermaxillary teeth stoutest. Length of the pectoral two-sevenths of that of the head; dorsal commencing at a short distance behind the extremity of the pectoral. Length of body two-thirds of that of the tail.

China.

a. Type of the species, 12 inches long. Presented by J. R. Reeves, Esq.

15. **Ophichthys broekmeyeri.**

Ophisurus broekmeyeri, *Bleek. Act. Soc. Sc. Indo-Nederl.* i. *Manado*, p. 71.
—— celebicus, *Bleek. l. c.* p. 70.
Ophichthys amboinensis, *Bleek. Ned. Tydschr. Dierk.* ii. p. 45; or *Atl. Ichthyol. Muræn.* p. 54, tab. 45. fig. 1.
—— broekmeyeri, *Bleek. Atl. Ichthyol. Muræn.* p. 53, tab. 15. fig. 1.
—— celebicus, *Bleek. l. c.* p. 54, tab. 15. fig. 3.

Coloration uniform. The length of the head is contained twice and one-third or twice and three-fourths in the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, slightly extending behind the orbit, two-sevenths of the length of the head; snout pointed. Eye of moderate size, two-thirds of the length of the snout, situated in the anterior fourth of the length of the head. Teeth pointed, fixed; intermaxillary teeth stoutest, forming a group; anterior maxillary teeth uni-, posterior biserial, whilst in the lower jaw the anterior are bi-, and the postorior uniserial. Vomerine teeth bi- or triserial. Length of the pectoral fin one-third of that of the head; dorsal commencing above the posterior third of the pectoral. Body about three-fourths as long as the tail.

Amboyna, Celebes.

a. Type of *O. broekmeyeri*, $12\frac{1}{2}$ inches long. Makassar. From Dr. Bleeker's Collection.

b. Type of *O. amboinensis*, 19 inches long. Amboyna. From Dr. Bleeker's Collection.

c. Type of *O. celebicus*, $7\frac{1}{2}$ inches long. Manado. From Dr. Bleeker's Collection.

Ophichthys celebicus was founded on two very young examples, said to have the maxillary and vomerine teeth in three series. One of these typical examples, which I have examined, has the maxillary teeth distinctly enough in two series on one side, whilst on the other the two series are a little more irregular. The vomerine teeth are biserial. The representation of the dentition in Bleeker's atlas is a schematic figure, like many others in the plates containing the Murænidæ, and very different from the real arrangement of the teeth.

16. **Ophichthys rhytidodermatoides.**

Ophiurus breviceps, *Cant. Mal. Fish.* p. 326, pl. 5. fig. 4 (teeth) (not *Richards.*).
—— rutidodermatoides, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 31.
—— lumbricoides, *Bleek. l. c.* p. 32.
Pisoodonophis rutidodermatoides, *Kaup, Apod.* p. 18.
—— lumbricoides, *Kaup, l. c.* p. 21.
Ophichthys rutidodermatoides, *Bleek. Atl. Ichthyol. Muræn.* p. 55, tab. 16. fig. 1.
—— lumbricoides, *Bleek. l. c.* p. 56, tab. 14. fig. 3.
—— breviceps, *Bleek. l. c.* p. 57.

Coloration uniform. The length of the head is one-fourth of the distance of the gill-opening from the vent. Snout pointed; cleft of the mouth of moderate width, extending behind the eye, about two-sevenths of the length of the head. Eye small, two-fifths of the length of the snout, situated in the anterior third of the length of the head. Teeth pointed, fixed; all biserial except the foremost of the maxillaries. Gill-openings rather close together. The length of the pectoral fin is one-third or two-sevenths of that of the head. Dorsal fin low, commencing nearly opposite to the extremity of the pectoral. Tail twice as long as the body.

Pinang, Java.

a–b. Types of *O. breviceps* (Cant.), skins. Pinang. From Dr. Cantor's Collection.

c. Type of *O. rutidodermatoides*, 24 inches long. Batavia. From Dr. Bleeker's Collection.

d. Type of *O. lumbricoides*, 16 inches long. Batavia. From Dr. Bleeker's Collection.

The differences in the dentition stated by Dr. Bleeker to exist between the species named by him are not confirmed by an examination of the typical specimens, or are merely slight accidental variations in the arrangement; and the figure which he gives of the dentition of *O. rutidodermatoides* is entirely erroneous.

17. **Ophichthys rhytidoderma.**

Ophisurus rutidoderma, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 30.
Ophichthys rutidoderma, *Bleek. Atl. Ichth. Muræn.* p. 55, taf. 29. fig. 3.

Coloration uniform. The length of the head is contained five times and a half in the distance of the gill-opening from the vent. Snout pointed; cleft of the mouth rather narrow, extending behind the eye, two-ninths of the length of the head. Eye small, situated in the anterior fourth of the length of the head. Teeth pointed, fixed, all biserial except the foremost of the maxillaries. Gill-openings rather close together. The length of the pectoral fin is one-third of that of the head. Dorsal fin lower than anal, commencing at a short distance behind the extremity of the pectoral. Tail twice as long as the body.

Java.

a. Type of the species, 38 inches long. Batavia. From Dr. Bleeker's Collection.

18. **Ophichthys macclellandi.**

Ophisurus macclellandi, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 33.
Pisoodonophis macclellandii, *Kaup, Apod.* p. 19.
Ophichthys macclellandii, *Bleek. Atl. Ichth. Muræn.* p. 57, tab. 15. fig. 2.

Coloration uniform. The length of the head is a little less than one-fourth of the distance of the gill-opening from the vent. Snout pointed. Cleft of the mouth of moderate width, extending behind the eye, about two-sevenths of the length of the head. Eye small, two-fifths of the length of the snout, situated in the anterior fourth of the length of the head. Teeth pointed, fixed, biserial, *except those on the vomer, which are arranged in three, and on the middle of the bone in four series.* Gill-openings rather close together. The length of the pectoral is nearly one-third of the length of the head; dorsal fin rather low, commencing opposite to the extremity of the pectoral. Tail twice as long as body.

Java.

a. Type of the species, 23 inches long. Batavia. From Dr. Bleeker's Collection.

19. Ophichthys marginatus.

Ophiurus marginatus, *Peters, Wiegm. Arch.* 1855, p. 272; *Günth. in Fish. Zanz.* p. 128.
Leptorhinophis marginatus, *Kaup, Apod.* p. 14.

Coloration uniform. The length of the head is one-sixth of the distance of the gill-opening from the vent. Cleft of the mouth narrow, extending somewhat behind the eye, which is small, one-half or one-third of the length of the snout, and situated in the anterior fourth of the length of the head. All the teeth small, equal, pointed, fixed, in double series. Anterior nasal tube extremely short. Pectoral very small, one-fifth of the length of the head; dorsal and anal fins very low, commencing at a very short distance behind the end of the pectoral. Tail one-third longer than the body.

East Africa.

a. Fourteen inches long. From Colonel Playfair's Collection.

2. *Mandibulary teeth uniserial.*

a. *Lips fringed.*

20. Ophichthys crocodilinus.

Ophisurus crocodilinus, *Bennett, Proc. Com. Zool. Soc.* 1831, p. 32.
Brachysomophis horridus, *Kaup, Apod.* p. 9, fig. 6; *Bleek. Versl. & Meded. Ak. Wet. Amsterd.* 1868, ii. p. 303.

The length of the head is one-third of the distance between the gill-opening and the vent. Snout extremely short and rather flattened, scarcely twice as long as the eye, which is small and situated in the anterior ninth of the length of the head. Teeth pointed, fixed, *unequal in size*; those of the intermaxillary stand in a transverse series; maxillary teeth in a double row, those of the inner row stronger and less numerous than the outer; vomerine and mandibulary teeth uniserial, large, canine teeth. *Lips fringed**. Gill-openings rather wide. Vertical fins moderately developed; the distance between the origin of the dorsal fin and gill-opening is about two-fifths of the length of the head. Pectoral small. Body longer than tail. Upper parts brownish, minutely dotted with darker. A series of black pores along the lateral line; sometimes a whitish line across the occiput.

Pacific; Japan; East-Indian archipelago; Mauritius.

a, *b*-*c*. Thirty-five inches long and half-grown. Galapagos Islands. From the Haslar Collection.

Bennett's diagnosis is so accurate that the fish may be at once recognized by it. The typical specimens from the Mauritius were transferred from the collection of the Zoological Society to that of the British Museum, and served Dr. Kaup in establishing the synonymous "*Brachysomophis horridus*," as he mentions them in his 'Catalogue of Apodal Fish,' although he omitted to trace their history. Unfortunately these valuable specimens, which were the types of the species, are now missing.

---

* The fringes are not developed in young examples.

Achirophichthys typus, Bleek. Ned. Tydschr. Dierk. ii. p. 42, and Atl. Ichthyol. Muræn. p. 39, tab. 47. fig. 3, is founded on a single example from Celebes, 8 inches long. It is apparently distinguished by the absence of pectoral fins, which induced Dr. Bleeker to create a distinct genus for it. However, its similarity to *O. crocodilinus* is so great that I cannot help thinking that it will eventually prove to be merely the young of that species. Young Murænoids have the fins generally less developed than adult; and although there is certainly not a pectoral developed, yet distinct traces of it may be seen on one side of the typical specimen. Dr. Bleeker mentions as a second principal character the equality of the jaws; but in reality the lower jaw is a little prominent, and in other undoubted examples of *O. crocodilinus*, which are not full-grown, the lower jaw is much less prominent than in adult specimens; so that also this character appears to be dubious, and is altogether useless for the creation of a genus.

21. Ophichthys cirrochilus.

Ophisurus cirrhocheilus, *Bleek. Act. Soc. Sc. Indo-Nederl.* ii. *Amboyna*, viii. p. 89.
Brachysomophis cirrhochilus, *Bleek. Atl. Ichthyol. Muræn.* p. 38, tab. 9.

The length of the head is about one-third of the distance between the gill-opening and the vent. Snout short and rather flattened, at least thrice as long as the eye, which is situated in the anterior fifth of the length of the head. Teeth as in *O. crocodilinus.* Lips fringed. Gill-openings rather wide. Vertical fins well developed; the distance between the origin of the dorsal fin and gill-opening is about two-thirds of the length of the head; the length of the pectoral is one-fourth of that of the head. Body and tail of nearly the same length. Brownish, with large, irregular, dark, transverse spots; fins yellowish, edged with brown.

Amboyna; Formosa.

a. Head and tail of a very large example. Formosa. From Consul Swinhoe's Collection.
b. Type of the species. Amboyna. From Dr. Bleeker's Collection.

b. *Lips not fringed.*

a. Snout much produced; large canine teeth.

22. Ophichthys serpens.

Serpens marinus, *Salvian.* fol. 57 & 58; *Bellon. De Aquat.* p. 156; *Rondel.* p. 409; *Willughby*, p. 107, tab. G. 4.
Muræna, sp. no. 4, *Artedi, Gen.* 24; *Syn.* 41.
Muræna serpens, *L. Syst. Nat.* i. p. 425.
Ophisurus serpens, *Lacép.* ii. p. 198: *Schleg. Faun. Japon. Poiss.* p. 264,

pl. 115. fig. 1; *Costa, Faun. Nap. Pesc.* tav. 28 bis. figs. 1 & 2 (skull); *Richards. Ichthyol. Ereb. & Terr.* p. 106; *Kaup, Apod.* p. 7.
Leptorhynchus capensis, *Smith, Ill. Zool. S. Afr. Pisc.* pl. 6.
Ophisurus macrorhynchus, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 28.
Muræna acutirostris, *Gronov. Syst.* ed. *Gray*, p. 19.

The length of the head is contained thrice and two-thirds or four times in the distance between the gill-opening and the vent. Snout slender, produced into a joint; cleft of the mouth very wide, half as long as the head. Eye of moderate size, two-sevenths of the length of the snout, situated in the anterior third of the length of the head. Teeth pointed, fixed, unequal in size, those of the intermaxillary and maxillary biserial, the others uniserial. The intermaxillary teeth and anterior of the mandible and those of the vomer are canine teeth. Gill-openings rather wide. Vertical fins moderately developed; the distance between the base of the pectoral and origin of the dorsal is twice or rather more than twice the length of the pectoral, the length of which is about one-sixth of that of the head.

The length of the body is somewhat more than one-half of that of the tail *. Uniformly coloured above, silvery below.

Mediterranean; Eastern Atlantic; Japan; Australia.

a. Half-grown. Bay of Naples. Presented by S. P. Pratt, Esq.
b, c. Half-grown. Mediterranean.
d. Adult. Atlantic.
e–f. Adult and young. Damara Land.
g. Adult. Japan. From Dr. Bleeker's Collection. Type of *O. macrorhynchus*.
h. Adult. Australia. Purchased of Mr. Bowerbank.

β. *Snout moderately produced; no large canine teeth.*

23. Ophichthys regius.

Ophisurus regius, (*Shaw*) *Richards. Voy. Ereb. & Terr. Fish.* p. 106.
Herpetoichthus regius, *Kaup, Apod.* p. 8 (cop. *Richards.*).

Ground-colour olive, with from 18 to 23 large round brown spots, each extending from the dorsal fin to the abdomen; they are larger than the interspaces, which, again, are ornamented by vertical series of small spots, the middle series being formed by somewhat larger spots. Head densely spotted with brown. Dorsal fin with numerous small spots, and with a series of larger spots along the margin. Anal fin nearly immaculate. The length of the head is one-third of the distance of the gill-opening from the vent. Cleft of the mouth very wide, nearly two-fifths of the length of the head. Eye small, two-fifths of the length of the snout, situated in the anterior fourth of the length of the head. Teeth sharply pointed; maxillary and anterior vomerine teeth in a double, the others in single series; the teeth of the inner maxillary series, of the vomer, and mandible depressible. The length of the pectoral is one-sixth of that of the head; dorsal commencing at a short distance behind the end of the pectoral. Tail rather shorter than the body.

---

* Viz. in Mediterranean examples = 29 : 48.
Atlantic examples ...... = 25 : 40,
or = 15 : 25.
Japanese examples ...... = 22 : 35.
Australian examples ... = 16 : 29.

St. Helena.

a. Type of the species, bleached. Old Collection.
b–c. Fine specimens, 32 inches long. St. Helena. Presented by J. C. Melliss, Esq.
d. Young. St. Helena. Presented by J. C. Melliss, Esq.—Body with broad brown cross bands.

24. **Ophichthys ornatissimus.**

Herpetoichthys ornatissimus, *Kaup, Apod.* p. 7, fig. 4 (not 5).

Sixteen or seventeen large round black spots along the lateral line, which are parted by another band of spots of different sizes. Irregular dark spots on the head; a transverse and two longitudinal series of white spots on the occiput; curved whitish lines between the eyes. Dorsal with black marginal spots and stripes. The length of the head is two-sevenths of the distance of the gill-opening from the vent. Cleft of the mouth very wide. Teeth pointed; maxillary and anterior vomerine teeth in a double, the others in a single series. The length of the pectoral is one-fourth of that of the head; dorsal commencing behind the end of the pectoral. Tail shorter than the body. (*Kaup.*)

Malabar.

25. **Ophichthys havannensis.**

Parra, p. 96, lam. 37. fig. 2 (bad).
Muræna havannensis, *Bl. Schn.* p. 491.
Herpetoichthys sulcatus, *Kaup, Apod.* p. 8, fig. 5 (not 6).
Ophisurus havanensis, *Poey, Mem.* ii. p. 320.
Uranichthys havanensis, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 257.
—— brachycephalus, *Poey, l. c.*

Head with numerous brown longitudinal folds; body covered with dark lines, which may easily be taken for folds. Brown; head with numerous small dark spots. A series of large round dark spots along the side, the interspaces being as wide as the spots. Another series of alternate smaller spots along the back, and along the sides of the abdomen. Fins yellowish; dorsal with a series of brown spots along the edge. Cleft of the mouth wide. Eye large, its diameter being contained once and two-thirds in the length of the snout. Maxillary teeth in a double, the others in a single series. Pectoral fin well developed, its extremity nearly opposite to the origin of the dorsal. Tail longer than the body.

Cuba.

This fish appears to be most closely allied to *O. triserialis*, p. 58.

26. **Ophichthys versicolor.**

Ophisurus versicolor, *Richards. Ereb. & Terr. Fish.* p. 103.
Elapsopsis versicolor, *Kaup, Apod.* p. 10.

Body encircled by 27 brown rings, twice as broad as the interspaces between them; each ring divided into two by a narrow circular white line; dorsal fin coloured as the body underneath. The length of the head is one-fifth of the distance of the gill-opening from the vent. Upper jaw much projecting beyond the lower; cleft of the mouth extending somewhat behind the eye, which is small, one-third of the length of the snout, and situated in the anterior third of that of the head. Teeth pointed, all immoveable; those of the intermaxillary in a double longitudinal series; maxillary teeth in a single series anteriorly, and in a double posteriorly; vomerine and mandibulary teeth in a single series. Pectoral fin small, shorter than the snout; dorsal fin commencing at a short distance behind the root of the pectoral. Tail and body subequal in length.

East-Indian archipelago.

a. Type of the species, 21 inches long. Purchased of Mr. Frank.

27. **Ophichthys ocellatus.**

Murænopsis ocellata, *Lesueur, Journ. Ac. Nat. Sc. Philad.* v. p. 108, pl. 4. fig. 3.
Ophisurus remiger, *Valenc. in D'Orb. Voy. Amér. Mérid. Poiss.* pl. 12. fig. 2.
—— ocellatus, *Richards. Voy. Ereb. & Terr. Fish.* p. 104.

A series of round white spots along the middle of the side of the body and tail; dorsal fin with a black edge: some white dots on the back behind the head, and a white line across the occiput. *The length of the head is rather less than one-third of the distance of the gill-opening from the vent.* Snout pointed, the upper jaw projecting beyond the lower; cleft of the mouth wide, two-fifths of the length of the head. Eye of moderate size, two-thirds of the length of the snout, and situated in the anterior third of that of the head. Teeth pointed, fixed, unequal in size*; the intermaxillary teeth are the largest, arranged in a curved transverse series; maxillary teeth in a double, vomerine and mandibulary teeth in a single series; only the anterior mandibulary teeth form a short double series. Length of the pectoral fin rather more than one-third of that of the head; dorsal fin commencing opposite to the posterior third of the pectoral. Tail longer than the body.

Atlantic coast of Tropical America.

a–b. Half-grown. Mexico. Presented by Sir J. Richardson.

28. **Ophichthys ater.**

Ophichthys (Herpetoichthys) ater, *Peters, Monatsber. Ak. Wiss. Berl.* 1866, p. 525.

The length of the head is contained twice and one-third in the distance between the gill-opening and vent; tail one-fourth longer than body; upper jaw but little projecting beyond the lower; eye rather large, equidistant from the extremity of the snout and cleft of the mouth; its diameter is two-ninths of the distance of the origin of the dorsal from the base of the pectoral. Teeth uniserial, biserial in the maxillaries. Coloration uniform. (*Ptrs.*)

---

* Prof. Kaup's statement, that the teeth are of equal length, is erroneous.

Chile.

B. *Maxillary teeth uniserial.*

1. *Dorsal fin commencing behind the root of the pectoral.*

29. **Ophichthys bonapartii.**

Pœcilocephalus bonapartii, *Kaup, Apod.* p. 5, fig. 3.
Ophisurus chrysospilos, *Bleek. Act. Soc. Sc. Indo-Nederl.* ii. *Amboyna,* viii. pp. 8, 27.
—— bonapartii, *Bleek. l. c.* p. 87.
Pœcilocephalus markworti, *Kaup, Aale d. Hamb. Mus.* p. 10, tab. 1. fig. 1.
Ophichthys bonapartei, *Bleek. Atl. Ichth. Muræn.* p. 47, pl. 14. fig. 2.

Light brownish, with from 18 to 23 dark-brown rings, extending on the basal part of the dorsal and anal fins; the anterior half of the head is brown, with yellowish, black-edged reticulated lines; throat with reniform brown dark-edged spots. The length of the head is nearly one-sixth of the distance of the gill-opening from the vent. Snout tetrahedral, pointed, with the upper jaw projecting beyond the lower. Cleft of the mouth rather wide, two-fifths of the length of the head; eye of moderate size, rather more than half the length of the snout, situated in the anterior fourth of the length of the head. Posterior nostril in advance of the eye. Teeth of moderate size, pointed, fixed, uniserial in all the bones. Pectoral small, shorter than the snout; the dorsal fin commences opposite to the extremity of the pectoral. Body nearly one-third longer than tail.

Amboyna.

a. Fine specimen, 27 inches long. From Dr. Bleeker's Collection.

30. **Ophichthys cephalozona.**

Centrurophis spadiceus, *Kaup, Apod.* fig. 1 (not descript., not *Richards.*).
Murænopsis marginatus, *Bleek. Ned. Tydschr. Dierk.* i. p. 179 (not *Ptrs.*).
Ophichthys cephalozona, *Bleek. Atl. Ichthyol. Muræn.* p. 49, tab. 12. fig. 2; *Kner, Novara, Fisch.* p. 377.

Body purplish brown; nape with a very broad deep-black cross band broadly edged with white in front and behind. Dorsal and anal fins tricoloured, viz. brownish along the base, black along the middle, and white along the margin. The length of the head is one-fourth of the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, slightly extending behind the eye; snout pointed, with the upper jaw much projecting beyond the lower. Eye of moderate size, one-half of the length of the snout, situated in the anterior third of the length of the head. Posterior nostril in advance of the eye; anterior with a broad tube. The intermaxillary teeth are stout, forming an irregular group; they, and a pair in front of the lower jaw, are stouter than the others, which are pointed, fixed, uniserial. The length of the pectoral fin is rather more than one-fourth of that of the head; dorsal commencing above the end of the pectoral. Tail sometimes rather longer, sometimes shorter than the body.

East-Indian archipelago; Japan; North Australia.

a. Type of the species. Amboyna. From Dr. Bleeker's Collection.
b. Half-grown. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
c. Half-grown. Cape York, N. Australia. Collected by Hr. Dämel.

Variety.—The nuchal band is less distinct; the body and fins marked with irregular dark-brown blotches; dorsal fin without white margin.

d. Adult. Japan. Purchased of Mr. Jamrach.
e. Half-grown. Zebu, Philippine Islands. Purchased of Mr. Jamrach.
f. Half-grown. Cape York. Collected by Hr. Dämel.

31. **Ophichthys apicalis.**

Ophisurus apicalis, *Bennett*, in *Life of Raffles*, p. 692.
—— spadiceus, *Richards. Ichthyol. Chin.* p. 313; *Voy. Ereb. & Terr. Ichthyol.* p. 103.
—— compar, *Richards. Voy. Ereb. & Terr. Ichthyol.* p. 105.
—— bangko, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 67.
Centrurophis spadiceus, *Kaup, Apod.* p. 2 (not fig.).
—— bangko, *Kaup, Apod.* p. 3.
Cœcilophis compar, *Kaup, Apod.* p. 6.
Ophisurus diepenhorsti, *Bleek. Act. Soc. Sc. Indo-Nederl.* viii. *Sumatra*, viii. p. 85.
Ophichthys banko, *Bleek. Atl. Ichthyol. Muræn.* p. 51, tab. 14. fig. 1.
—— diepenhorsti, *Bleek. Atl. Ichth. Muræn.* p. 52, tab. 15. fig. 4.

Coloration uniform brown. The length of the head is two-fifths of the distance of the gill-opening from the vent. Cleft of the mouth extending somewhat behind the eye—which is of moderate size, and one-half of the length of the snout. Intermaxillary and anterior part of the vomerine teeth in a double series, maxillary and mandibulary teeth in a single series; sometimes the foremost mandibulary teeth form an irregular double series. The length of the pectoral is one-third, or rather more than one-third, of that of the head. Dorsal commencing above the middle or the posterior third of the pectoral. Tail not twice as long as the body.

Indian and Chinese Seas.

a. Type of *O. spadiceus*. China. Presented by J. R. Reeves, Esq.
b, c. Half-grown and young. China.

d. Type of *Ophisurus bangko*. Java. From Dr. Bleeker's Collection.
e. Type of *O. compar*, and probably also of *O. apicalis*. Sumatra.
f. Type of *O. diepenhorsti*. From Dr. Bleeker's Collection. This example is evidently an *O. spadiceus*, and ornamented on the back with some irregular whitish blotches.

The mandibulary teeth of the typical specimen of *O. compar* are decidedly one-rowed. Kaup has evidently merely copied Richardson, and founded, on his authority, the genus *Cæcilophis*.

32. **Ophichthys grandoculis.**

Ophisurus grandoculis, *Cantor, Mal. Fish.* p. 324, pl. 5. fig. 3 (teeth).

Coloration uniform, dorsal and posterior part of anal edged with black. The length of the head is two-sevenths of the distance of the gill-opening from the vent. Cleft of the mouth extending somewhat behind the eye—which is of moderate size, and one-half of the length of the snout. Intermaxillary and anterior part of the vomerine teeth in a double series; maxillary and mandibulary teeth in a single series. The length of the pectoral is one-third of that of the head; dorsal commencing above the posterior third of the pectoral. Length of the body two-thirds of that of the tail.

Pinang.

a–b. Typical specimens: skins. From Dr. Cantor's Collection.

33. **Ophichthys bernsteinii.**

Muræuopsis bernsteinii, *Bleek. Ned. Tydschr. Dierk.* i. p. 157.
Ophichthys bernsteini, *Bleek. Atl. Ichthyol. Muræn.* p. 48, tab. 24. fig. 1.

Coloration uniform. The length of the head is one-fifth or rather less than one-fifth of the distance between the gill-opening and vent. Snout pointed, with the upper jaw projecting beyond the lower; cleft of the mouth of moderate width, about one-third of the length of the head; eye of moderate size, its diameter being more than one-half the length of the snout; it is situated in the anterior third of the length of the head. Posterior nostril in advance of the eye, anterior with a short broad tube. Teeth of moderate size, pointed, fixed, uniserial, except the anterior on the vomer, which are biserial. *Pectoral nearly one-third of the length of the head; dorsal fin commencing above the extremity of the pectoral.* Tail rather longer than body. (*Blkr.*)

Halmaheira.

34. **Ophichthys singapurensis.**

Ophichthys singapurensis, *Bleek. Atl. Ichthyol. Muræn.* p. 52, tab. 44. fig. 1.

Uniform brown. The length of the head is nearly one-fourth of the distance of the gill-opening from the vent. Snout pointed, with the upper jaw much projecting beyond the lower. Cleft of the mouth of moderate width; eye rather small, its diameter being less than one-half of the length of the snout. Posterior nostril in advance of the eye. Intermaxillary teeth in a double longitudinal series; *vomerine teeth in a triple series anteriorly*, and in a double posteriorly; maxillary and mandibulary teeth uniserial. Fins well developed; the pectoral nearly one-third of the length of the head; dorsal commencing above the end of the pectoral. Tail one-third longer than the body.

Singapore.

a. Type of the species, 21 inches long. From Dr. Bleeker's Collection.

35. Ophichthys macrochir.

Ophisurus macrochir, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 27; *Nat. Tydschr. Ned. Ind.* vii. p. 446.
Centrurophis macrochir, *Kaup, Apod.* p. 5.
Ophichthys macrochir, *Bleek. Atl. Ichthyol. Muræn.* p. 54, tab. 20. fig. 1.

Coloration uniform. The length of the head is one-fourth of the distance of the gill-opening from the vent. Snout pointed; cleft of the mouth of moderate width, extending behind the eye, two-sevenths of the length of the head. Eye small, one-half of the length of the snout, situated in the anterior fourth of the length of the head. Teeth pointed, fixed; those of the intermaxillary and vomer biserial, the others uniserial. Gill-openings rather close together. Fins well developed; the length of the pectoral is one-third of the length of the head; the dorsal commences nearly opposite to the extremity of the pectoral. Tail twice as long as the body.

Java.

a. Type of the species, 20 inches long. Batavia. From Dr. Bleeker's Collection.

36. Ophichthys hispanus.

Ophisurus hispanus, *Bellotti, Accad. Fisico-medico-statistica di Milano, Seduta del 23 dicembr.* 1857.

The length of the head is one-fourth of the distance of the gill-opening from the vent; tail longer than body. Snout obtusely conical, projecting beyond the mouth, the cleft of which extends backwards behind the eye, and is two-sevenths of the length of the head. Eye of moderate size, half as long as the snout, situated in the anterior third of the length of the head. Posterior nostril in advance of the eye, anterior with a broad tube. The intermaxillary teeth in a double, the others in a single series; all subequal in size. The length of the pectoral is one-fifth of that of the head; the distance of the origin of the dorsal from the base of the pectoral is conspicuously more than the length of the head; anal higher than dorsal. Body powdered with brownish.

Mediterranean.

a. Twenty inches long. Cannes. Presented by Dr. Theodore Günther.

Although our specimen differs slightly from the Barcelona examples described by Bellotti, which have the vomerine and mandibulary teeth for a short distance arranged in two series anteriorly, they agree so well in all other essential points that they evidently belong to the same species.

37. **Ophichthys remicaudus.**

Centrurophis remicaudus, *Kaup, Apod.* p. 3.

Brownish, with numerous dark specks; dorsal and anal fins with brownish and whitish spots along the base; a series of small whitish warts across the occiput. The length of the head is one-fourth of the distance of the gill-opening from the vent. Upper lip without appendages. Eye large, near the angle of the mouth. Teeth pointed, uniserial (vomerine teeth biserial?). The length of the pectoral fin is somewhat less than one-half of that of the head; the dorsal commences at a moderate distance from the tip of the pectoral. Tail rather longer than body. (*Kaup.*)

Sicily.

38. **Ophichthys brasiliensis.**

Centrurophis brasiliensis, *Kaup, Apod.* p. 4.

Yellowish brown, with black dots. The length of the head is rather less than one-fourth of the distance of the gill-opening from the vent. Teeth pointed, uniserial (vomerine teeth biserial?). *Pectoral fin one-fourth of the length of the head; dorsal fin commencing at some distance behind the pectoral.* Tail longer than body. (*Kaup.*)

Rio Janeiro.

39. **Ophichthys urolophus.**

Conger urolophus, *Schleg. Faun. Japon. Poiss.* p. 260, pl. 114. fig 1.

Coloration uniform, fins with a white margin. The length of the head is about one-third of the distance of the gill-opening from the vent; cleft of the mouth one-third of the length of the head; eye of moderate size, contained once and two-thirds in the length of the snout, which is pointed. Teeth uniserial, except those of the intermaxillary. Pectoral fins well developed; the dorsal commences at a short distance behind the end of the pectorals. Posterior portion of the vertical fins somewhat elevated. (*Schleg.*)

Japan.

2. *Dorsal fin commencing above or nearly above the gill-opening.*

40. **Ophichthys polyophthalmus.**

Ophichthys polyophthalmus, *Bleek. Ned. Tydschr. Dierk.* ii. p. 43; and *Atl. Ichthyol. Muræn.* p. 47, pl. 42. fig. 3.

Brownish on each side, with three series of large rounded brownish-black spots arranged alternately; each spot of the dorsal series with a whitish centre. Snout yellowish, head with numerous white, dark-edged ocelli. Dorsal fin with a basal series of brown spots, each with a whitish centre; margin of the fin black; a series of elongate blackish spots along its middle; anal fin nearly immaculate. The length of the head is two-ninths of the distance of the gill-opening from the vent. Snout tetrahedral, moderately pointed, with the upper jaw slightly projecting beyond the lower. Cleft of the mouth of moderate width, one-third of the length of the head; eye of moderate size, two-thirds of the length of the snout, situated in the anterior third of the length of the head. Posterior nostril in advance of the eye; anterior with a rather long truncated tube. Teeth of moderate size, pointed, fixed, uniserial in all the bones; some of the front teeth rather larger than the others. Pectoral fin small, as long as the snout; dorsal commencing opposite to the base of the pectoral. Tail as long as the trunk without head.

Amboyna.

a. Type of the species, 15 inches long. From Dr. Bleeker's Collection.

41. **Ophichthys altipinnis.**

Microdonophis altipinnis, *Kaup, Apod.* p. 6, fig. 3 (not 4).
Murænopsis altipinnis, *Bleek. Ned. Tydschr. Dierk.* i. p. 180.
Ophichthys altipinnis, *Bleek. Atl. Ichthyol. Muræn.* p. 50, tab. 13. fig. 2.
—— melanochir, *Bleek. Ned. Tydschr. Dierk.* i. p. 44; and *Atl. Ichth. Muræn.* p. 51, tab. 48. fig. 3.

Coloration uniform; anterior part of the dorsal blackish; pectoral and margins of the dorsal and anal blackish. Dorsal fin elevated, its anterior portion being nearly as high as the body underneath. The length of the head is one-third or two-sevenths of the distance of the gill-opening from the vent. Cleft of the mouth of moderate width, about one-third of the length of the head; snout pointed, with the upper jaw much projecting beyond the lower. Eye of moderate size, rather less than one-half of the length of the snout, situated on the anterior third of the length of the head. Posterior nostril in advance of the eye. Teeth pointed, fixed; the intermaxillary teeth form a double longitudinal series, and are opposed to the front teeth of the mandible, which are stronger than the others. Maxillary, vomerine, and lateral mandibulary teeth uniserial. Pectoral two-fifths of the length of the head; dorsal fin commencing above the gill-opening. Body about three-fourths as long as the tail.

Celebes and Amboyna.

a. Type of *O. melanochir*, 27 inches long. Amboyna. From Dr. Bleeker's Collection.

3. *Dorsal fin commencing in advance of the gill-opening.*

42. **Ophichthys calamus.**

The length of the head is one-fifth of the distance of the gill-opening from the vent. Snout convex, obtusely conical; cleft of the mouth of moderate width, one-fourth of the length of the head;

eye rather small, one-half of the length of the snout, situated above the middle of the mouth. Teeth small, uniserial, apparently in two series on the vomer*. *Lips fringed.* Gill-openings narrow and close together. Fins moderately developed. The dorsal fin commences at a short distance behind the angle of the mouth; pectoral fin one-fourth of the length of the head. Tail nearly twice as long as the body. Brownish, lower parts whitish.

Australia.

a. Seventeen inches long. Freemantle.

C. *Maxillary teeth equally small, forming bands; lips fringed.*

43. **Ophichthys chinensis.**

Cirrhimuræna chinensis, *Kaup, Apod.* p. 27.
Ophisurus polyodon, *Bleek. Act. Soc. Indo-Nederl.* viii .*Sumatra,* viii. p. 86.
Cirrhimuræna polyodon, *Bleek. Atl. Ichthyol. Muræn.* p. 41, tab. 8. fig. 1.

The length of the head is two-fifths or rather more than two-fifths of the distance between the gill-opening and the vent. Snout produced, pointed, *the cleft of the mouth being two-fifths of the length of the head.* Eye small, situated in the anterior fifth of the length of the head. Teeth small, pointed, *of equal size*; those of the intermaxillary and maxillary form a rather broad band, and those of the vomer and mandible are arranged in a double or triple series†. *Lips fringed.* Gill-openings rather narrow and close together. Vertical fins moderately developed; the dorsal fin commences above the gill-opening; *pectoral fin narrow and long,* nearly one-half of the length of the head. Tail twice or nearly twice as long as the body. Coloration uniform.

China, Sumatra.

a. Type of the species, 7 inches long. China.
b. Type of *C. polyodon,* 11 inches long. Priaman. From Dr. Bleeker's Collection.

44. **Ophichthys tapeinopterus.**

Cirrhimuræna tapeinopterus, *Bleek. Nederl. Tydschr. Dierk.* p. 183; or *Atl. Ichthyol. Muræn.* p. 41, tab. 8. fig. 3; ? *Kner, Novara, Fisch.* p. 376.

The length of the head is contained twice and a third in the distance of the gill-opening from the vent. Snout produced, pointed, *the cleft of the mouth being one-third of the length of the head.* Eye small, situated in the anterior fifth of the length of the head. Teeth small, pointed, of *equal size,* forming a broadish band in the maxillary, and narrower ones along the vomer and mandibles. *Lips fringed.* Gill-openings rather narrow and close together. Vertical fins moderately developed; the dorsal fin commences above the gill-opening; pectoral fin long, one-half of the length of the head. Tail twice as long as the body. Coloration uniform.

---

* All the bones are much softened by the fluid in which the specimen has been preserved; and the teeth are very indistinct and partly destroyed.

† Kaup's description is erroneous.

Java, Celebes.

a. Type of the species, 11½ inches long. Java. From Dr. Bleeker's Collection.

45. **Ophichthys chilopogon.**

Ophisurus cheilopogon, *Bleek. Act. Soc. Sc. Indo-Nederl.* viii. *Celebes,* xiii. p. 59.

Cirrhimuræna chilopogon, *Bleek. Atl. Ichthyol. Muræn.* p. 42, tab. 19. fig. 2.

The length of the head is contained twice and two-thirds in the distance of the gill-opening from the vent. Snout produced, pointed; *the cleft of the mouth being two-fifths of the length of the head.* Teeth small, pointed, of equal size, forming a broadish band in the maxillary and mandible, and a narrower along the vomer. *Lips fringed.* Gill-openings rather narrow and close together. Fins well developed; the dorsal fin commences immediately behind the base of the pectoral fin, which is two-fifths as long as the head. The length of the body is contained once and two-thirds in that of the tail. Coloration uniform.

Celebes.

a. Type of the species, 19 inches long. Badjoa. From Dr. Bleeker's Collection.

46. **Ophichthys playfairii.**

The length of the head is nearly one-fourth of the distance of the gill-opening from the vent. Snout pointed, not quite thrice as long as the eye—which is small, situated above the middle of the mouth; cleft of the mouth of moderate width, one-third of the length of the head. Teeth small, of equal size, forming narrow bands. *Lips fringed.* Gill-openings narrow and rather close together. Fins well developed; the dorsal fin commences at a short distance behind the angle of the mouth; pectoral fin one-fourth of the length of the head. Tail not quite twice as long as the body. Coloration uniform.

Zanzibar.

a. Twenty-one inches long. Presented by Lieut.-Col. Playfair.

D. *Maxillary teeth tri- or quadriserial; lips not fringed.*

47. **Ophichthys pacifici.**

Brown, a series of very small whitish dots along the anterior part of the lateral line; some similar dots on the nape; dorsal fin with a black edge. *The length of the head is contained twice and one-third in the distance between the gill-opening and the vent.* Snout pointed, the upper jaw projecting beyond the lower; cleft of the mouth wide, two-fifths of the length of the head. Eye of moderate size, two-thirds of the length of the snout, and situated in the anterior third of that of the head. Teeth pointed, fixed, unequal in size; the intermaxillary teeth are the largest, arranged in a curved transverse series; maxillary and mandibulary teeth forming a tri- or quadriserial band in adult examples, biserial in smaller individuals. Vomerine teeth in a single series. Length of the pectoral fin rather more than one-third of that of the head; dorsal fin low, commencing opposite to the extremity of the pectoral. Tail longer than the body.

Chile and Peru.

a. Twenty-five inches long. Chile. From the Godeffroy Collection as *O. remiger*. Teeth of the jaws quadriserial.

b–d. Sixteen inches long. Tambo River. Purchased of Mr. Whitely. Teeth of the jaws biserial.

Although this species is allied to *O. remiger* (with which it has been confounded by Prof. Kner), it is evidently distinct, having a longer head and a different dentition.

II. *Teeth granular.*

A. *Pectoral developed; dorsal commencing behind the base of the pectoral.*

48. Ophichthys boro.

Ophisurus boro, *Ham. Buch. Fish. Gang.* pp. 20, 363; *Gray, Ill. Ind. Zool.*; *M'Clell. Calc. Journ. Nat. Hist.* v. p. 211; *Richards. Ichth. Chin.* p. 313, and *Voy. Ereb. & Terr. Fish.* p. 99; *Bleek. Verh. Bat. Gen.* xxv. *Beng.* p. 156; *Cant. Mal. Fish.* p. 322, pl. 5. fig. 2 (teeth).

—— harancha, *Ham. Buch. l. c.* pp. 21, 363; *Gray, l. c.*; *M'Clell. l. c.* tab. 12. fig. 4.

—— caudatus, *M'Clell. l. c.* p. 185, tab. 12. fig. 3.

Conger microstoma, *Eyd. & Soul. Voy. Bonite*, i. p. 205, *Poiss.* pl. 9. fig. 3 (if this identification of Hr. Kaup is correct, the figure is erroneous).

Ophisurus potamophilus, *Bleek. Nat. Tydschr. Ned. Ind.* v. p. 458, or *Verh. Bat. Gen.* xxv. *Muræn.* p. 68.

Pisoodonophis boro, *Kaup, Apod.* p. 17; *Bleek. Atl. Ichth. Muræn.* p. 62, tab. 20. fig. 3; *Day, Fish. Malab.* p. 248.

—— potamophilus, *Kaup, Apod.* p. 20; *Bleek. l. c.* p. 63, tab. 28. fig. 2.

Coloration uniform. *The length of the head is contained from thrice and a half to four times and a half in the distance of the gill-opening from the vent*; the length of the body is three-fourths or two-thirds of that of the tail. Cleft of the mouth of moderate width, extending behind the eye; snout depressed, obtuse in old examples, and rather more pointed in young. Eye small. Teeth granular, in several series, forming bands which are broader in adult examples than in young. Length of the pectoral fin one-fourth or one-sixth of that of the head; dorsal fin commencing at some distance behind the end of the pectoral; *dorsal and, especially, anal fins low.*

East Indies, sea and fresh waters; ? Tropical America.

a. Large specimen, 50 inches long. River Hooghly. From the Collection of the East-India Company.

b, c, d, e, f. Many half-grown and young examples. River Hooghly.

g. Adult. Bengal. Presented by General Hardwick.

h–i. Half-grown. Bengal. Presented by G. R. Waterhouse, Esq.

k. Adult: skin. Pinang. From Dr. Cantor's Collection.

l. Adult. Pinang. From Dr. Cantor's Collection.

m. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.

n. Type of *O. potamophilus*. Borneo. From Dr. Bleeker's Collection.

o. Adult. Zebu (Philippine Islands). Purchased of Mr. Jamrach.

p, q, r. Many adult, half-grown, and young specimens. Formosa.

s. ? Half-grown. Grenada (West Indies). Purchased of Mr. Cutter. An examination of other specimens may prove this to be a distinct species; but at present I do not think myself justified in separating this single specimen from *O. boro*, which varies rather considerably in the relative proportions of the parts of the body.

49. **Ophichthys cancrivorus.**

? Conger flavipinnatus, *Bennett, Proc. Comm. Zool. Soc.* 1831, p. 168.
Ophisurus cancrivorus, *Richards. Voy. Ereb. & Terr. Fish.* p. 97, tab. 50. figs. 6–9.
—— sinensis, *Richards. l. c.* p. 98.
Ophiurus baccidens, *Cant. Mal. Fish.* p. 320, tab. 5. fig. 1 (teeth).
Ophisurus schaapi, *Bleek, Nat. Tydschr. Ned. Ind.* iii. p. 735; or *Verh. Bat. Gen.* xxv. *Muræn.* p. 53.
—— brachysoma, *Bleek. l. c.* 1°, p. 776; or *l. c.* 2°, p. 55.
Pisoodonophis cancrivorus, *Kaup, Apod.* p. 15, fig. 9 (cop. from *Richards.*); *Kner, Novara, Fisch.* p. 379.
—— brachysoma, *Kaup, Apod.* p. 19; *Bleek. Atl. Ichth. Muræn.* p. 60, tab. 18. fig. 2.
—— schaapi, *Kaup, l. c.*; *Bleek. l. c.* tab. 17. fig. 1.
—— moluccensis, *Bleek. Atl. Ichthyol. Muræn.* p. 72, taf. 49. (not 45) fig. 2.

Coloration uniform. The length of the head is two-fifths or nearly one-third of the distance of the gill-opening from the vent; the length of the body from three-fourths to nearly two-thirds of that of the tail. Cleft of the mouth rather wide, about one-third of the length of the head; snout depressed, somewhat pointed. Eye of moderate size, nearly one-half of the length of the snout. Teeth granular, forming broadish bands. Length of the pectoral fin about two-sevenths or one-third of that of the head; dorsal commencing above the middle of the pectoral; dorsal and anal fins of moderate depth. A more or less distinct blackish spot anteriorly on the dorsal fin.

East-Indian archipelago; Australia.

a. Adult. Pinang. From Dr. Cantor's Collection. Type of *O. baccidens*.

b. Adult. Singapore. One of the typical specimens of *O. cancrivorus*.

c. Adult. Makassar. From Dr. Bleeker's Collection. Type of *O. brachysoma*.
d. Adult. East-Indian archipelago. From Dr. Bleeker's Collection. Type of *O. schaapi*.
e. Half-grown. Amboyna. From Dr. Bleeker's Collection. Type of *P. moluccensis*.
f. Half-grown. Philippine Islands. One of the typical specimens of *O. cancrivorus*.
g. Half-grown. Australia. Presented by the late Earl of Derby.
h. Adult. Mauritius (?). From the collection of the Zool. Soc. Probably the type of *Conger flavipinnatus*. None of the specimens transferred from the collection of the Zoological Society to that of the British Museum agrees better with Bennett's description than this. The end of the tail is slightly injured, so that Bennett may have been deceived in determining the genus. His note on the dentition is evidently incomplete. If future researches should prove that this species is really found at the Mauritius, every doubt as to the identity of *C. flavipinnatus* and *O. cancrivorus* may be considered to be removed.

50. **Ophichthys hoevenii.**

Ophisurus hoevenii, *Bleek. Nat. Tydschr. Ned. Ind.* v. p. 172; or *Verh. Bat. Gen.* xxv. *Muræn.* p. 67.
Pisoodonophis hoevenii, *Kaup, Apod.* p. 20; *Bleek. Atl. Ichth. Muræn.* p. 59, taf. 16. fig. 2.

Coloration uniform. The length of the head is contained twice and two-thirds in the distance of the gill-opening from the vent; *the length of the body is equal to that of the tail.* Cleft of the mouth rather wide, somewhat less than one-third of the length of the head; snout acutely pointed. Eye rather small, two-fifths of the length of the snout. Teeth granular, forming rather narrow bands. Length of the pectoral fin about two-sevenths of that of the head; the dorsal commencing above the middle of the pectoral. Dorsal and anal fins well developed.

Celebes.

a. Type of the species, 12½ inches long. Makassar. From Dr. Bleeker's Collection.

51. **Ophichthys hypselopterus.**

Ophisurus hypselopterus, *Bleek. Nat. Tydschr. Ned. Ind.* ii. p. 69; or *Verh. Bat. Gen.* xxv. *Muræn.* p. 34.
Pisoodonophis hypselopterus, *Kaup, Apod.* p. 19; *Bleek. Atl. Ichthyol. Muræn.* p. 63, taf. 17. fig. 2.

Coloration uniform. The length of the head is two-sevenths of the distance of the gill-opening from the vent; tail nearly twice as long as body. Cleft of the mouth rather wide; snout depressed, somewhat pointed; eye small. Teeth granular, in several series, forming broadish bands; those of the intermaxillary are twice as large as the others. Length of the pectoral fin one-fourth of that of the head; dorsal commencing at some distance behind the pectoral; *dorsal and, especially, anal fins elevated*, the latter being as deep as the body.

Bandjermassing.

a. Typical specimen. From Dr. Bleeker's Collection.

B. *Pectoral developed; dorsal commencing in advance of the gill-opening.*

52. **Ophichthys semicinctus.**

Ophisurus semicinctus, *Richards. Voy. Ereb. & Terr. Fish.* p. 99.

Body and tail with sixteen or seventeen broad black cross bands, broader than the interspaces between them, and not extending across the abdomen. Head with numerous small brownish-black spots. The length of the head is contained twice and two-thirds in the distance of the gill-opening from the vent, that of the body once and one-third or once and one-fourth in that of the tail. Snout of moderate length, depressed, rather obtuse. Cleft of the mouth rather wide, extending behind the eye, which is small and situated in the anterior third of the length of the head. Teeth granular, forming broadish bands, narrower in young examples. Length of the pectoral fin two-sevenths of that of the head; dorsal commencing somewhat in advance of the gill-opening, and, like the anal, well developed.

West Africa.

a. Type of the species, 29 inches long. West Africa. Presented by the Royal College of Surgeons.

b, *c*, *d*. Adult. West Africa.

e. Adult: stuffed. West Africa. Presented by the late Earl of Derby.

f. Adult. River Gambia.

g. Adult. Old Calabar. Presented by A. Murray, Esq.

h. Adult. Brass River.

53. **Ophichthys dromicus.**

Three series of large round brown spots along the side; a single series along the median line of the back, the spots being arranged alternately. Three large spots on the upperside of the head. Body very slender, its depth being about one-ninetieth of the total length. The length of the head is one-sixth of the distance of the gill-opening from the vent; tail longer than the body. Snout of moderate length, slightly compressed, rather pointed. Cleft of the mouth of moderate width, extending behind the eye, which is small and situated in the anterior fourth of the length of the head. Teeth granular, biserial; uniserial on the side of the mandible. Pectoral fin short, but with distinct rays, one-seventh of the length of the head; dorsal commencing behind the occiput, and, like the anal, well developed.

West Africa.

a. Twenty-nine inches long.

C. *Pectoral rudimentary; dorsal commencing in advance of the gill-opening.*

54. Ophichthys colubrinus.

Muræna colubrina, *Boddaert, in Pallas's Neue Nord. Beytr.* ii. 1781, p. 56, pl. 2. fig. 3.
—— annulata, *Ahl, De Muræna et Ophichtho,* 1789, p. 8, tab. 1. fig. 1.
—— fasciata, *Ahl, l. c.* p. 9.
Gymnothorax annulatus, *Bl. Schn.* p. 527.
—— fasciatus, *Bl. Schn.* p. 529.
—— colubrinus, *Bl. Schn.* p. 529.
Ophisurus fasciatus, *Lacép.* iv. p. 686; *Richards. Ereb. & Terr. Fish.* p. 100; *Bleek. Atl. Ichthyol. Muræn.* p. 64, tab. 21. fig. 1; *Kner, Novara, Fisch.* p. 379.
—— alternans, *Quoy & Gaim. Voy. Uran.* i. p. 243, pl. 45. fig. 2.
—— colubrinus, *Richards. l. c.* p. 100; *Bleek. Nat. Tydschr. Ned. Ind.* xi. p. 106.
Ophithorax colubrina, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 212 (not synon.).
Pisoodonophis fasciatus, *Kaup, Apod.* p. 23.

Body surrounded with numerous brown rings. The length of the head is nearly one-eighth of the distance of the gill-opening from the vent; the length of the body equals that of the tail. Snout short, pointed; cleft of the mouth of moderate width, one-fourth of the length of the head, slightly extending behind the eye. Eye very small. Teeth obtusely conical, biserial. *Pectoral fin rudimentary; dorsal commencing immediately behind the nape*; dorsal and anal fins rather low, the latter terminating at some distance from the extremity of the tail.

East-Indian archipelago; Pacific.

Var. *α. colubrina* s. *annulata.* Brown rings simple, narrower or broader than the interspaces, which are immaculate.

a. Adult. Borneo. Presented by Sir J. Richardson.
b, c, d. Adult and half-grown. East-Indian archipelago.
e–f, g–h. Adult, half-grown, and young. Feejee Islands.

Var. *β. fasciata.* The intervals between the brown rings are ornamented by more or less regular ocellated spots.

i. Adult. Borneo.
k, l, m. Adult.

55. Ophichthys maculosus.

Ophisurus ophis, *Lacép.* ii. pp. 195, 196, pl. 6. fig. 2 (not *Bloch*); *Bleek. Atl. Ichth. Muræn.* p. 65, tab. 16. fig. 3.
Muræna maculosa, *Cuv. Règne Anim.*
Ophisurus maculosus, *Richards. Ereb. & Terr. Fish.* p. 102.
Pisoodonophis maculosus, *Kaup, Apod.* p. 21.

Five alternate series of round brown spots along the body; the uppermost on the dorsal fin, the second partly on the back, partly on the dorsal. The length of the head is one-fifth of the distance of the gill-opening from the vent; the length of the body is three-fourths of that of the tail. Snout short, broad; cleft of the mouth of moderate width, one-fourth of the length of the head, extending to the vertical from the hind margin of the orbit. Eye of moderate size. Teeth obtusely conical (probably granular with age), biserial. *Pectoral fin extremely short: dorsal commencing on the nape*; dorsal and anal fins rather low.

Indian Ocean.

a–b. Twenty-two inches long. Madagascar. Presented by Dr. J. E. Gray.

c. Twenty inches long. Banda. From Dr. Bleeker's Collection.

56. **Ophichthys breviceps.**

Ophisurus breviceps, *Richards. Voy. Ereb. & Terr. Fish.* p. 99.
Pisoodonophis breviceps, *Kaup, Apod.* p. 20.
—— coronata, *Kaup, Aale Hamburg. Mus.* p. 14, tab. 2. fig. 1.

The length of the head is two-sevenths of the distance of the gill-opening from the vent; the length of the body is two-thirds of that of the tail. Snout short, broad, the muscles on the occiput being swollen, rendering the upper profile concave. Cleft of the mouth rather wide, somewhat less than one-third of the length of the head. Eye small. Teeth granular, forming a large, broad patch on the intermaxillaries, and being arranged in two or three series on the other bones. *Pectoral fin rudimentary; dorsal commencing immediately behind the nape*; dorsal and anal fins well developed. Body with two alternate series of round brown spots.

West Indies; Pacific coast of Central America.

a. Type of the species, 38 inches long. Presented by the Royal College of Surgeons.

b. Ten inches and a half long. Pacific coast of Central America. Presented by Capt. Dow.

The characters are taken from the larger, typical example. Our second example appears to belong to the same species; it is young, ornamented with two series of large brown spots on the body; head with small black spots; the dorsal fin with a black margin. The nape is not more prominent than in other species of this genus.

57. **Ophichthys pardalis.**

Ophisurus pardalis, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 90, pl. 16. fig. 2, or *Richards. Ereb. & Terr. Fish.* p. 100.
Pisoodonophis oculatus, *Kaup, Apod.* p. 22.
Ophisurus latemaculatus, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 252, tab. 3. fig. 1 (head).

Body with two series of brownish-black ocellated spots, each with a white centre; dorsal fin with irregular diffuse brown spots. The length of the head is two-sevenths or two-ninths of the distance of the gill-opening from the vent; the length of the body is from three-fourths to nearly two-thirds of that of the tail. Snout of moderate length and width; cleft of the mouth of moderate width, one-fourth of the length of the head, extending behind the small eye. Teeth granular, triserial, except on the maxillaries, on which they are biserial. *Pectoral fin extremely short; dorsal commencing immediately behind the occiput.*

Cape Verde Islands; Canary Islands; West Indies.

a. Twenty-five inches long. Lanzarote. Presented by the Rev. R. T. Lowe.

b. Half-grown. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

c. Half-grown. West Indies. Presented by Ch. Darwin, Esq.

I believe that this is the species named *pardalis* by Valenciennes, although he does not mention the white centre of the brown spots, which may have disappeared. Probably this is also the *Pisoodonophis oculatus* of Kaup, which is (evidently erroneously) described as having the body longer than the tail. Specimen *c* has been named *Pisoodonophis guttulatus* by this gentleman.

58. **Ophichthys quincunciatus.**

Four alternate series of round brown spots along the body, the uppermost on the back, partly extending on the dorsal. Dorsal fin with a series of ill-defined spots along the margin, anal with a series of spots similar to those on the body. The length of the head is one-fourth of the distance of the gill-opening from the vent; the length of the body is four-fifths of that of the tail. Snout depressed, pointed; cleft of the mouth of moderate width, nearly one-fourth of the length of the head, extending a little behind the eye. Eye of moderate size, one-half of the length of the snout. Teeth granular, those of the intermaxillary, vomer, posterior portion of maxillary, and anterior of mandible in a triple series, the remainder biserial. *Pectoral fin very short; dorsal commencing on the nape;* dorsal and anal fins well developed. Head with rather numerous round brown spots.

Habitat —— ?

a. Twenty-seven inches long; tail sixteen inches.

59. **Ophichthys acuminatus.**

Muræna acuminata, *Gronov. Syst.* ed. *Gray*, p. 21.
Pisoodonophis guttulatus, *Kaup*, *Apod.* p. 21, fig. 10.
Ophisurus longus, *Poey*, *Repert. Fis.-nat. Cuba*, ii. p. 254.

Two or three alternate series of round *yellowish* spots along the body; head with numerous small yellow spots; spots on the dorsal fin yellow, diffuse. The length of the head is one-fifth of the distance of the gill-opening from the vent; the length of the body is three-fourths of that of the tail. Snout rather short and obtuse; cleft of the mouth of moderate width, extending somewhat behind the small eye. Teeth granular, biserial in young examples, but forming broadish bands along the palate and mandibles, and narrower

in the maxillaries. *Pectoral fin extremely short; dorsal commencing on the nape*; dorsal and anal fins well developed.
West Indies.

a, b, c. Thirty-three inches long, and young. Cuba. From the Collection of the Zoological Society.
d–e. Half-grown. Barbadoes. Purchased of Mr. Cutter.

III. *Teeth equally small, conical; pectoral absent (rarely rudimentary); gill-openings close together.* Sphagebranchus.

A. *The dorsal commences at some distance behind the gill-opening.*

60. **Ophichthys imberbis.**

Sphagebranchus imberbis, *De la Roche, Ann. Mus.* xiii. p. 360, pl. 25. fig. 18; *Risso, Eur. Mérid.* iii. p. 196; *Costa, Faun. Nap. Pesc.* tav. 32. figs. 2, 3, 4; *Kaup, Apod.* p. 25.
—— oculatus, *Risso, l. c.* p. 197.
Leptocephalus spallanzani, *Risso, Ichth. Nice*, p. 85.

The length of the head is contained five times and a half in the distance between the gill-opening and the vent. Cleft of the mouth narrow, extending behind the eye, two-ninths of the length of the head. Snout pointed. Teeth uniserial, except on the intermaxillary, and sometimes on the anterior part of the vomer, where they are placed in a double series. A rudiment of the pectoral fin is generally visible; the dorsal fin is very low, and commences at a distance from the gill-opening, which exceeds the length of the head. Tail somewhat longer than the body. Coloration uniform.
Mediterranean.

a, b. Adult. Mediterranean.
c. Adult. Algiers. Presented by Lieut.-Col. Playfair.
d. Adult. Sicily. Presented by W. Swainson, Esq.
e. Adult. Nice. From Dr. Deakin's Collection.
f. Adult. Old Collection.

61. **Ophichthys anceps.**

Dalophis anceps, *Cantor, Mal. Fish.* p. 327, pl. 6.

The length of the head is contained nine times and three-fourths in the distance between the gill-opening and the vent; body longer than the tail. The very minute eye is situated at the commencement of the second eighth of the head, nearly above the middle of the lip; its distance from the muzzle is a little more than one-eighth of the length of the head; the distance from the muzzle to the angle of the mouth is two-ninths of the length of the head. Snout pointed. Teeth pointed, in a double series on the intermaxillary, anterior part of the vomer, and near the symphysis of the mandible; otherwise uniserial. Pectoral fin none; the dorsal is low, and commences at a great distance behind the gill-opening. Coloration uniform.
Sea of Pinang.

a. Type of the species: skin. From Dr. Cantor's Collection.

62. Ophichthys moluccensis.

Dalophis moluccensis, *Bleek. Nat. Tydschr. Ned. Ind.* v. p. 246; or *Verhand. Bat. Gen.* xxv. *Muræn.* p. 70.
Sphagebranchus moluccensis, *Kaup, Apod.* p. 26; *Bleek. Atl. Ichthyol. Muræn.* p. 68, tab. 11. fig. 1.

The length of the head is two-ninths of the distance between the gill-opening and the vent; tail scarcely a little longer than the body. Cleft of the mouth rather narrow, extending behind the eye. Snout pointed. Teeth pointed; those of the intermaxillary and anterior part of the vomer biserial, the others uniserial. Pectoral fin none; the dorsal is well developed, and commences at some distance behind the gill-opening. Coloration uniform.

Batjan, Ceram.

a. Type of the species. From Dr. Bleeker's Collection.

63. Ophichthys fuscus.

Muræna fusca, *Zuiew, Nov. Act. Ac. Sc. Petrop.* vii. 1793, p. 296, tab. 7. fig. 1.
Sphagebranchus brevirostris, *Peters, Wiegm. Arch.* 1855, p. 273; *Kaup, Abhandl. Ntrwiss. Verein. Hamburg*, iv. 2. 1860, p. 16.

The length of the head is contained thrice and two-thirds in the distance between the gill-opening and the vent; tail longer than the body. Cleft of the mouth wide, more than one-third of the length of the head, the eye being situated above its anterior half. Snout pointed. Teeth pointed, uniserial, except those of the intermaxillary, which are in a double series. Pectoral fin none; the dorsal is low, and commences at some distance behind the gill-opening. Coloration uniform.

Madagascar.

a–g. Adult and half-grown. Madagascar. Collected by Mr. Plant.

64. Ophichthys macrodon.

Sphagebranchus macrodon, *Bleek. Ned. Tydschr. Dierk.* i. p. 184; or *Atl. Ichth. Mur.* p. 69, tab. 12. fig. 1.

The length of the head is two-sevenths of the distance between the gill-opening and the vent; tail somewhat longer than the body. Cleft of the mouth rather wide, one-third of the length of the head, the eye being situated above its middle. Snout pointed. Teeth pointed, uniserial, except those of the intermaxillary, which are in a double series. Pectoral fin none; the dorsal is moderately developed, and commences at a short distance behind the gill-opening. Coloration uniform. (*Blkr.*)

Coasts of Borneo and Rotti.

65. Ophichthys polyophthalmus.

? Cœcula pterygera, *Vahl, Skrivt. Naturh. Selsk.* iii. 1794, p. 149, taf. 13.
Dalophis polyophthalmus, *Bleek. Nat. Tydschr. Ned. Ind.* iv. p. 299; or *Verh. Bat. Gen.* xxv. *Muræn.* p. 69.

Anguisurus punctulatus, *Kaup, Apod.* p. 24, fig. 12 (head).
Sphagebranchus polyophthalmus, *Kaup, Apod.* p. 26; *Bleek. Atl. Ichthyol. Muræn.* p. 70, taf. 10. fig. 1.

The length of the head is very little less than one-fourth of the distance between the gill-opening and the vent; tail shorter than the body. Cleft of the mouth wide, the eye being above its middle. Snout narrow, much pointed. Teeth pointed, uniserial, except those of the intermaxillary, which are in a double series. Pectoral fin none; dorsal well developed, commencing at some distance behind the gill-opening. A series of yellow ocelli along each side of the body; a yellow band across the nape, and two series of ocelli between the band and the origin of the dorsal.

Java, Sumatra, and Batjan.

a. One of the typical specimens. From Dr. Bleeker's Collection.

This is probably the fish described by Vahl; but he represents the eye as minute. Perhaps this was merely an individual peculiarity.

66. **Ophichthys kaupi.**

Sphagebranchus kaupi, *Bleek. Act. Soc. Sc. Indo-Neerl.* v. *Celebes*, xii. p. 3; or *Atl. Ichthyol. Muræn.* p. 70, tab. 13. fig. 1.

The length of the head is contained five times and one-half in the distance between the gill-opening and the vent; tail rather longer than the body. Cleft of the mouth of moderate width, extending behind the eye. Snout pointed. Teeth pointed, uniserial, except those of the intermaxillary, which are in a double series. Pectoral fin none; the dorsal is well developed, and commences at some distance behind the gill-opening. Coloration uniform.

Rivers of Celebes.

a. Type of the species, 13½ inches long. From Dr. Bleeker's Collection.

B. *The dorsal fin commences above or nearly above the gill-opening.*

67. **Ophichthys bicolor.**

Lamnostoma bicolor, *Kaup, Apod.* p. 24.
Sphagebranchus bicolor, *Kaup, Abhandl. Ntrwiss. Verein. Hamburg*, iv. 2. 1860, p. 15; *Bleek. Ned. Tydschr. Dierk.* i. p. 185; and *Atl. Ichthyol. Mur.* p. 69, tab. 11. fig. 3.

The length of the head is one-fifth of the distance between the gill-opening and vent; tail scarcely longer than the body. Cleft of the mouth of moderate width, extending behind the eye. Snout pointed; teeth pointed, uniserial. Pectoral fin none; the dorsal is moderately developed, and commences immediately behind the gill-opening. Coloration uniform.

Borneo.

68. **Ophichthys timorensis.**

Sphagebranchus lumbricoides, *Bleek. Ned. Tydschr. Dierk.* ii. p. 46;

or *Atl. Ichthyol. Muræn.* p. 71, pl. 44. fig. 4 (*not* Ophichthys lumbricoides, *Blkr.*).

The length of the head is nearly one-sixth of the distance between the gill-opening and the vent. Tail at least as long as the body (if not longer). Cleft of the mouth of moderate width, the eye being above its middle. Snout pointed. Teeth pointed; those of the intermaxillary and anterior part of the vomer biserial, the others uniserial. Pectoral fin none; dorsal and anal fins rudimentary, the former commencing above the gill-opening; the latter begins to be distinct at some distance behind the vent. Coloration uniform.

Timor.

a. Type of the species, 9 inches long. From Dr. Bleeker's Collection.

69. **Ophichthys orientalis.**

Russell, i. no. 37.
Dalophis orientalis, *M'Clell. Calc. Journ. Nat. Hist.* 1845, p. 213.
Lamnostoma pictum, *Kaup, Apod.* p. 23, fig. 11.
Sphagebranchus orientalis, *Kner, Novara, Fische*, p. 380.

The gill-openings are longitudinal slits, placed side by side on the ventral surface, the membrane forming a broad double fold. Snout much pointed, the projecting part being longer than broad, having the anterior nostrils at its lower surface. The length of the head is scarcely less than one-third of the distance between the gill-opening and the vent. Tail as long as the body. Cleft of the mouth of moderate width, the small eye being nearly above its middle. Teeth pointed, uniserial. Dorsal and anal fins low, the former commencing at a very short distance behind the gill-opening. A series of round whitish spots across the occiput, with a short bar on each side directed forwards.

Southern India; Ceylon.

a. Adult. Madras. Presented by Capt. Mitchell.

C. *The dorsal fin commences conspicuously in advance of the gill-opening.*

70. **Ophichthys melanotænia.**

Callechelys melanotænia, *Bleek. Atl. Ichthyol. Muræn.* p. 66, tab. 49. fig. 2.

The length of the head is one-tenth of the distance between the gill-opening and the vent, the length of the tail being one-third of that of the body. Cleft of the mouth narrow, extending behind the eye. Snout pointed. Teeth pointed; those of the intermaxillary strong, recurved, biserial; the others uniserial. Pectoral fin none; the dorsal fin commences at the vertical from the angle of the mouth. Whitish; a broad, well-defined, deep-black band along the upper part of each side; head blackish, marbled with whitish. Dorsal fin with a black margin.

Amboyna.

a. Type of the species, 19 inches long. From Dr. Bleeker's Collection.

71. Ophichthys marmoratus.

Dalophis marmorata, *Bleek. Verh. Bat. Gen.* xxv. *Muræn.* p. 37; and *Nat. Tydschr. Ned. Ind.* vii. p. 100.
Sphagebranchus marmoratus, *Kaup, Apod.* p. 26.
Callechelys marmoratus, *Bleek. Atl. Ichthyol. Muræn.* p. 66, pl. 11. fig. 2.

The length of the head is contained eight times and one-half in the distance between the gill-opening and the vent, the length of the tail being not much more than one-half of that of the body. Cleft of the mouth narrow, extending behind the eye. Snout rather pointed. Teeth pointed, recurved, uniserial, those on the intermaxillary and vomer biserial. Pectoral fin none; the dorsal fin commences at the vertical from the angle of the mouth. Irregularly marbled with brown.

Sumatra.

a. Type of the species, 34 inches long. Siboga. From Dr. Bleeker's Collection.

The description of *Callechelys guichenoti*, Kaup, Apod. p. 28, from Tahiti, is so short and insufficient that it cannot, at present, be distinguished from the above species; the author says:—"The whole body is dotted and freckled with black on a dark blue or, perhaps, greenish ground-colour. Towards the end of the tail the black predominates. Fins white, with a broadish irregular black border."

72. Ophichthys longipinnis.

Sphagebranchus longipinnis, *Kner & Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1867, liv. p. 390, fig. 14.

The length of the head is contained nine times and one-half in the distance between the gill-opening and the vent; tail nearly as long as the body. Cleft of the mouth narrow, slightly extending behind the eye, which is very small. Snout rather pointed, of moderate extent. Anterior nostril tubular. Teeth pointed, uniserial. Pectoral fin none; the dorsal is moderately developed, and commences in advance of the gill-opening. Coloration uniform.

Samoa Islands.

a. One of the typical specimens. From the Godeffroy Museum.

73. Ophichthys tenuis.

The length of the head is one-seventh of the distance between the gill-opening and the vent; body and tail subequal in length. Cleft of the mouth narrow, extending behind the eye, which is small, situated above the middle of the mouth. Snout acutely pointed, about thrice as long as the eye, projecting considerably beyond the mouth. Anterior nostril without tube, posterior on the inner side of the lip, below the front margin of the eye. Teeth pointed, uniserial; intermaxillary teeth placed in a triangle. Pectoral fin none: the dorsal is moderately developed, and commences about midway between the gill-opening and angle of the mouth. Coloration uniform.

Habitat ——?

a–c. Twenty-one inches long.—These specimens were named *S. bicolor* by Dr. Kaup, but are evidently different from the type of that species, which is in the Leyden Museum.

74. **Ophichthys kirkii.**

The length of the head is one-eighth or one-ninth of the distance between the gill-opening and vent; tail somewhat longer than the body. Cleft of the mouth of moderate width, extending to some distance behind the eye, which is small, situated above the middle of the mouth. Snout pointed, about twice as long as the eye, projecting beyond the mouth. Anterior nostril with a small tube, posterior on the inner side of the lip, below the front margin of the eye. Teeth pointed, uniserial. Pectoral fin none; the dorsal is rather low, and commences about midway between the gill-opening and the angle of the mouth. Coloration uniform.

Rovuma Bay (East Africa).

a, b. Several specimens (14 inches long). Presented by Dr. Kirk.

D. *Dorsal and anal fins absent.*

75. **Ophichthys quadratus.**

Sphagebranchus quadratus, *Richards. Voy. Sulph. Fish.* p. 115, pl. 52. figs. 8–15.

Tail tetrahedral, not rounded. Fins none. The length of the head is one-seventh of the distance between the gill-opening and vent. Cleft of the mouth of moderate width, the eye being situated above its middle. Snout projecting far beyond the mouth. Teeth uniserial, those on the vomer partly biserial.

China.

a. Type of the species, 6½ inches long, not in good state. From the Collection of Vice-Admiral Sir E. Belcher.

76. **Ophichthys cæcus.**

Muræna cæca, *L. Syst. Nat.* i. p. 426.
Sphagebranchus cœcus, *Bl. Schn.* p. 505.
Cœcilia branderiana, *Lacép.* ii. p. 135.
Apterichthys cæcus, (*Dumeril*) *De la Roche, Ann. Mus.* xiii. p. 325. fig. 6.
Sphagebranchus spallanzani, *Costa, Faun. Nap. Pesc.* tav. 32. fig. 1.

Body elongate, slender; tail longer than the body. Fins none. Snout acutely pointed, with the upper jaw projecting much beyond the lower. Eyes not externally visible. Gill-openings ventral, approximate. Teeth of the jaws uniserial. Coloration reddish, with dark dots. (*De la Roche.*)

Mediterranean.

77. Ophichthys gracilis.

Ophisuraphis gracilis, *Kaup, Apod.* p. 29.

Body slender; tail rounded, longer than the body. Fins none. Anterior nostrils not denticulated. "The punctiform eyes are situated nearer to the point of the snout." No vomerine teeth (?). Length to the angle of the mouth 0·24 inch, to the gill-opening 0·67 inch, to the anus 4·02 inches; length of tail 5·81. (*Kaup.*)

Hab. —— ?

78. Ophichthys acutirostris.

Ichthyapus acutirostris, *Bris. de Barneville, Rev. Zool.* 1847, p. 219; *Kaup, Apod.* p. 28.

Body slender, tail rounded, longer than the body; fins none. The border of the anterior nostril is denticulated; it is at the lower side of the snout. Eye over the middle of the jaws. Length to the gill-opening 0·79 inch, to the anus 4·14 inches; length of tail 4·92 inches.

Open sea, under the equator.

Ninth Group. PTYOBRANCHINA.

22. MORINGUA.

Moringua, *Gray, Zool. Misc.* p. 9.
Raitaboura, *Gray, l. c.*
Ptyobranchus, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 200.
Aphthalmichthys, *Kaup, Apod.* p. 105.
Pseudomoringua, &c., *Bleek. Atl. Ichth. Mur.* p. 14.

Body scaleless, cylindrical, with the trunk much longer than the tail. Pectorals none or small; vertical fins but little developed, limited to the tail. Posterior nostrils in front of the small eye. Cleft of the mouth narrow. Teeth uniserial. Heart placed far behind the branchiæ. Gill-openings rather narrow, inferior.

East Indies; Feejee Islands; Japan.

1. Moringua raitaborua.

Muræna raitaborua, *Ham. Buch. Fish. Gang.* pp. 25, 364.
Rataboura hamiltonii, *Gray, Zool. Misc.* p. 9.
—— hardwickii, *Gray, l. c.*; and *Ill. Ind. Zool.* c. fig.
Ptyobranchus arundinaceus, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 200, pl. 10. fig. 1.
—— guthrianus, *M'Clell. l. c.* p. 201, pl. 10. fig. 2.
—— erythreus, *M'Clell. l. c.* pl. 9. fig. 3 (half-grown).
—— multidentata, *M'Clell. l. c.* pl. 9. fig. 4 (half-grown).
—— brevis, *M'Clell. l. c.* p. 223 (young).
—— parvidentata, *M' Clell. l. c.* p. 202, pl. 9. fig. 5.
—— gracilis, *M'Clell. l. c.* pl. 9. fig. 6 (young).
Anguilla (Moringua) raitaborua, *Cant. Nat. Tyds. Ned. Ind.* iv. p. 228, tab. 1.
Moringua raitaborua, *Bleek. Verh. Bat. Gen.* xxv. *Beng. & Hind.* p. 154; *Kaup, Apod.* p. 106.

Moringua macrochir, *Bleek. Nat. Tyds. Ned. Ind.* ix. p. 71, or *Atl. Ichth. Mur.* p. 15, pl. 3. fig. 1 (young); *Kner, Novara, Fisch.* p. 389.
—— lumbriciformis, *Kaup, Apod.* p. 107 (half-grown).

In *adult* examples (12 to 22 inches) the greatest depth of the body is not less than one-fiftieth of the total length. Lower jaw the longer. Pectoral fins present. Dorsal and anal occupying the greater part of the tail, both interrupted in the middle; origin of the anal distant from the vent, the distance being generally about equal to one-half of the length of the head.

Young examples (up to about 8 inches) are comparatively much shorter; the pectorals are very small; and the anal is nearer to the vent.

Bengal; Batu.

a. Numerous adult, half-grown, and young examples. Hooghly. Presented by the East-India Company.
b. Adult. India. Presented by General Hardwicke.
c. Half-grown. India. Presented by General Hardwicke.—Type of *M. lumbriciformis*, Kaup.
d. Half-grown. Batu. From Dr. Bleeker's Collection.—Type of *M. macrochir*.
e. Adult: skeleton. Hooghly.

Skeleton. The abdominal vertebræ have the transverse processes short and dilated, terminating in three points, the middle of which bears a slender rib. A second series of similar ribs along the dorsal part of the vertebral column. No superior spinous processes. Vert. 90/40.

2. Moringua lumbricoidea.

? Moringua linearis, *Gray, Zool. Misc.* p. 9; and *Ill. Ind. Zool.* c. fig.
Moringua lumbricoidea, *Richards. Voy. Sulph. Ichth.* p. 113, pl. 56. figs. 7–11; *Kaup, Apod.* p. 107.
—— microchir, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 124; or *Verh. Bat. Gen.* xxv. *Mur.* p. 66; or *Atl. Ichth. Mur.* p. 16, pl. 4. fig. 2.

In specimens 10 or 11 inches long the greatest depth of the body is one forty-fourth or one forty-eighth of the total length. Pectoral fins very small or rudimentary. Dorsal and anal fins occupying the greater part of the tail, the middle rays being rather shorter than the anterior and posterior; anal commencing at a short distance from the vent.

China; Amboyna; Sumatra.

a. Type of the species. China. Presented by J. R. Reeves, Esq.
b. Type of *M. microchir*. Amboyna. From Dr. Bleeker's Collection.

3. Moringua bicolor.

Kaup, Apod. p. 107; *Bleek. Atl. Ichth. Mur.* p. 15, pl. 3. fig. 1.

In an example about 15 inches long the greatest depth of the body is not less than one-sixtieth of the total length; in another of 31 inches it is only one-ninetieth. Lower jaw the longer. Pectoral fins present. Dorsal and anal occupying the greater part of the tail, interrupted in the middle; their origins opposite to each other, and their distance from the vent exceeding the length of the head.

Timor.

a. Thirty-one inches long. Presented by the Royal College of Surgeons.

4. Moringua javanica.

Aphthalmichthys javanicus, *Kaup, Apod.* p. 105, fig. 71; *Bleek. Ned. Tyds. Dierk.* i. p. 164; or *Atl. Ichth. Mur.* p. 16, pl. 2. fig. 2.

Pectorals none; vertical fins reduced to a narrow fringe of the end of the tail. The greatest depth of the body is one seventy-fifth or one-hundredth of the total length.

Java, Celebes, Ceram, Timor; Feejee Islands; Japan.

a. Adult. From Dr. Bleeker's Collection.
b. Adult. Moluccas.
c. Young. Feejee Islands. Purchased of Herr Dämel.
d. Adult. Japan.

5. Moringua abbreviata.

Aphthalmichthys abbreviatus, *Bleek. Ned. Tyds. Dierk.* i. p. 163; or *Atl. Ichth. Mur.* p. 17, pl. 1. fig. 1.

Pectoral and vertical fins reduced to slight folds of the skin, with a few rudimentary rays at the extremity of the tail. The greatest depth of the body is one-fortieth or one forty-fourth, and the length of the head one-twelfth or one-thirteenth of the total length.

East-Indian archipelago.

a. Type of the species. From Dr. Bleeker's Collection.

6. Moringua macrocephala.

Aphthalmichthys macrocephalus, *Bleek. Ned. Tyds. Dierk.* i. p. 165; or *Atl. Ichth. Mur.* p. 17, pl. 3. fig. 2.

Probably not distinct from the preceding species, from which it differs only in having a longer head, its length being one-ninth of the total.

Timor.

a. Type of the species. Timor. From Dr. Bleeker's Collection.
b. Young. India. Presented by General Hardwicke.

Second Subfamily.

MURÆNIDÆ ENGYSCHISTÆ.

The branchial openings in the pharynx are narrow slits.

Tenth Group. MURÆNINA.

23. MYROCONGER.

Scaleless. Head without conspicuous muciferous cavities. Cleft of the mouth wide. All the teeth acicular, subequal in size, forming broadish bands, the vomerine band tapering into a single series terminating far back in the mouth. Pectoral and vertical fins well developed, the dorsal fin commencing in advance of the small gill-opening. The posterior nostril is on the level of the upper margin of the orbit, the anterior in a tube. Eye of moderate size.

St. Helena.

1. Myroconger compressus.

Body compressed, rather deep; snout of moderate length, depressed, with the lower jaw rather prominent. The cleft of the mouth extends somewhat behind the eye, which is of moderate size, one-half of the length of the snout, and one-eighth of that of the head. The dorsal fin commences midway between occiput and gill-opening; pectoral about as long as the snout. The length of the head is one-half of that of the trunk; tail longer than the body. The skin of the throat and chest shows traces of large scale-pouches, regularly arranged, each about half the size of the eye. Uniform whitish.

St. Helena.

a. Fine specimen, 22 inches long. Presented by J. C. Melliss, Esq.

24. MURÆNA *.

Muræna, sp., *Artedi*, *Linn.*, *Bloch.*
Gymnothorax, *Bloch*, *Bl. Schn.*
Muræophis, *Lacép.*
Muræna, *Cuv.*, *Richardson.*
Echidna, *J. R. Forster.*
Thærodontis, Strophidon, Lycodontis, *M'Clelland.*
Muræna, Sidera, Eurymyctera, Thyrsoidea, Limamuræna, Polyuranodon, Pœcilophis, Gymnomuræna, Priodonophis, Tæniophis, *Kaup.*
Pseudomuræna, *J. Y. Johnson.*
Echidna, Gymnothorax, Priodonophis, Strophidon, Thyrsoidea, *Bleeker.*

---

* 1. Gymnothorax wilsoni, *Bl. Schn.* p. 529.—G. (dentibus palatinis nullis ?) capite parvo, crasso, viridi, maculis roseis latis ornato, pinna dorsali longitudine dorsi, ano capiti propinquiore quam apici caudæ. Hab. in Nova Hollandia, *Banning* dictus.

2. Murænophis stellata, *Lacép.* v. pp. 629, 622, 644.—La dorsale très basse et commençant très-près de la nuque; les deux mâchoires garnies de dents aiguës et clair-semées; deux rangées de dents semblables de chaque côté du palais; deux séries longitudinales de taches en forme d'étoiles irrégulières, de chaque côté de l'animal. Sa couleur générale

Scaleless. Teeth well developed. Gill-openings narrow. Pectoral fins none; dorsal and anal well developed. Two nostrils on each side of the upper surface of the snout; the posterior a narrow round foramen, with or without tube, the anterior in a tube.

Seas of the temperate and tropical regions.

---

paraît d'un jaune mêlé de blanc, les taches étoilées sont d'un pourpre tirant sur le noir ; la série supérieure de ces taches en renferme ordinairement vingt, et l'inférieure vingt-une.—Nouvelle Bretagne.

3. Murænophis haüy, *Lacép.* v. pp. 629, 646, pl. 17. fig. 2.—Hab. —?—Name of a drawing.
4. Muræna fulva, *Risso, Ichth. Nice*, p. 367, or *Eur. Mérid.* iii. p. 190.—Mediterranean.—Corpore fulvo, brunneo fasciato.
5. —— marmorata, *Quoy & Gaim. Voy. Freyc. Zool.* p. 247.—Waigiou and Rawak.—Six inches long.
6. Murænophis lineata, *Less. Voy. Coq. Zool.* p. 127, pl. 11. fig. 1.—Island of Oualan.
7. —— flaveola, *Less. l. c.* p. 128, pl. 11. fig. 2.—Island of Oualan.
8. Muræna cerino-nigra, *Richards. Ichth. Chin.* p. 314.—Canton.—Known from a drawing only.
9. Thyrsoidea blochii, *Kaup, Apod.* p 90 ; Gymnothorax borneensis, *Bleek. Atl. Ichth. Mur.* p 102, pl. 37. fig. 2.—East Indies.—Known from a single young example !
10. Muræna micropœcilus, *Bleek. Nat. Tyds. Ned. Ind.* viii. p. 459 ; Gymnothorax micropœcilus, *Bleek. Ned. Tyds. Dierk.* i. p. 246, or *Atl. Ichth. Mur.* p. 105, pl. 38. fig. 1.—East-Indian archipelago.—Founded upon young examples in which the specific characters are not yet developed.
    a. Type of the species. Cocos. From Dr. Bleeker's Collection.
11. Muræna mauritiana, *Kaup, Apod.* p. 65.—Mauritius.—Short, obtuse head; blackish, with some brown dots or markings; fins with a yellowish edge.—An = *M. flavomarginata* ?
12. Muræna nigrolineata, *Kaup, Apod.* p. 66.—Marquesas Islands.
13. —— flavimarginata, *Kaup, Apod.* p. 67.—Bourbon.—Spotted with yellow; a black stripe runs from the throat to the vent.
14. —— chrysops, *Kaup, Apod.* p. 70.—Otaheiti.—Teeth uniserial, mandibulary 12. Snout considerably obtuse. Upper parts black, with yellowish-brown stars and star-like figures. Lips and mandible yellowish brown, with black zigzag markings.
15. —— multiocellata, *Poey, Mem. Cuba*, ii. p. 324 ; and *Repert. Fis.-nat. Cuba*, ii. p. 258.—Cuba.
16. —— erebus, *Poey, Mem. Cub.* ii. p. 426 ; and *Repert. Fis.-nat. Cuba*, ii. p. 258.—Cuba.
17. Murenophis appendiculata, *Guichenot in Gay, Chile*, p. 341.
18. —— porphyreus, *Guichenot, l. c.* p. 342, lam. 11. fig. 2.
19. Thyrsoidea kaupii, *Abbott, Proc. Ac. Nat. Sc. Philad.* 1860, p. 477.—Sandwich Islands.
20. —— eurosta, *Abbott, l. c.* p. 478.—Sandwich Islands.
21. —— concolor, *Abbott, l. c.* p. 479.—Vera Cruz.
22. Gymnothorax scriptus, *Bl. Schn.* p. 529.—Corpore tereti, serpentiformi, striis transversis et lituris figuras litterarum arabicarum imitantibus, fuscis, capite parvo, rictu angusto, cauda obtusa, naribus tubulosis.—New Holland.
23. Muræna canina, *Quoy & Gaim. Voy. Uran. Zool.* p. 247.—Uniform blackish; cleft of the mouth wide, with large teeth; eyes large; vent nearer to the head than to the end of the tail; dorsal fin beginning on the head.—Waigiou and Rawak.
24. —— mordax, *Ayres, Proc. Calif. Acad. Nat. Sc.* 1859, p. 30.—Cerros Island.—Origin of the dorsal about at the commencement of the second third of the length of the fish. Coloration dark, with linear short mottlings of a lighter shade.

Sir John Richardson has divided the species of this genus into smaller groups, distinguished by the dentition. Dr. Kaup has done nothing beyond adopting these groups and attaching generic names to them. However, only in a comparatively small part of the species is the arrangement of the teeth of systematic value, as the dentition changes to a considerable extent with age. Young examples have generally more series of teeth than mature or old individuals. Especially with regard to the one, two, or three large teeth forming an inner maxillary series, it appears that normally these teeth enter the outer series as the age of the individual advances. This change is by no means regular, and one or two inner teeth are sometimes found in examples of considerable size. Further, in some species the biserial arrangement appears to be persistent through life; in other species, which are known from a few examples only, we have no means of judging of the extent of change. The uni- or biserial arrangement of the vomerine teeth is also subject to much variation. In the following synopsis the maxillary teeth are admitted to be biserial only when the inner series consists of several (more than three) teeth.

Synopsis of the Subgenera and Species.

I. Teeth acute.
    A. Posterior nostrils tubular: *Muræna,* p. 96.
    B. Posterior nostrils not tubular: *Gymnothorax,* p. 100.
        1. Body moderately elongate; tail not (or not much) longer than the body; snout of moderate extent.
            a. Ornamented by well-defined white (in spirits) spots or ocelli.
                α. Maxillary and intermaxillary teeth biserial, p. 100.
                β. Maxillary teeth only biserial, p. 101.
                γ. Maxillary teeth uniserial, p. 102.
            b. Ornamented by well-defined black cross bands, p. 104.
            c. Ornamented by well-defined polygonal or round black spots, p. 106.
            d. Ornamented by yellowish lines forming a network, p. 110.
            e. Body with dark or light markings, which are not well defined and more or less irregular.
                α. Maxillary teeth biserial, p. 112.
                β. Maxillary teeth uniserial, p. 116.
            f. Snout ornamented with brown longitudinal bands, p. 122.
            g. Coloration uniform.
                α. Dorsal fin elevated, p. 122.
                β. Dorsal fin not elevated, p. 123.
        2. Snout slender, much elongate, p. 127.
        3. Exceedingly elongate, the tail being twice as long as the body (*Thyrsoidea,* Blkr.), p. 127.
        4. Exceedingly elongate, the tail being nearly as long as the body (*Strophidon,* Blkr.), p. 128.
II. Most of the teeth are obtuse, molar-like: *Pœcilophis,* p. 128.

Skeleton.—Orbit generally a complete osseous ring. Suture between maxillary and intermaxillary very distinct. Anterior vertebræ with a broad inferior spinous process; transverse process of the abdominal vertebræ deeply concave, sometimes cup-shaped; caudal vertebræ with short transverse upper and lower spinous processes.

	Vertebræ.				
	Abdominal.		Caudal.		
Muræna helena	69–71	+	72–70	=	141
—— *meleagris*	60	+	60	=	120
—— *undulata*	64	+	68	=	132
—— *moringa*	65	+	79	=	144
—— *unicolor*	65	+	71	=	136
—— *zebra*	97	+	38	=	135
—— *nebulosa*	65	+	57	=	122
—— *catenata*	65	+	51	=	116

I. *Teeth acute.*

A. *Posterior nostrils tubular*: Muræna.

1. Muræna helena.

Μύραινα, *Aristot.* i. c. 5, ii. c. 13 & 15, iii. c. 10, v. c. 10, viii. c. 2, 13 & 15, ix. c. 2; *Ælian*, i. c. 32 & 50, ix. c. 40 & 66; *Athen.* lib. vii.
Muræna, *Plin.* ix. c. 16, 19, 20, 23, 54, 55; xxxii. c. 2, 5, 7 & 8; *Bellon. De Aquat.* p. 158; *Rondel.* xiv. c. 5, p. 402; *Salvian*, pp. 59, 60; *Willughby, Hist. Pisc.* p. 103, tab. G 1; *Aldrov.* iii. c. 27, pp. 356, 357.
Muræna, sp. no. 6, *Artedi, Synon.* p. 41; *Genera*, p. 25; *Gronov. Zoophyl.* no. 164.
Muræna helena, *L. Syst. Nat.* i. p. 425; *Brünn. Pisc. Mass.* p. 11; *Bloch, Ausländ. Fisch.* ii. p. 31, taf. 153; *Risso, Ichth. Nice*, p. 366, and *Eur. Mérid.* iii. p. 189; *Costa, Faun. Nap. Pesc.*, with figure of skull; *Jenyns, Man.* p. 479; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 406, and 3rd edit. i. p. 73; *Couch, Fish. Brit. Isl.* iv. p. 335, pl. 237 (not good); *Guichen. Explor. Algér. Poiss.* p. 114; *Gronov. Syst.* ed. *Gray*, p. 18; *Richards. Voy. Ereb. & Terr. Ichthyol.* p. 80, pl. 49. figs. 1–6; *Kaup, Apod.* pp. 55 (synonymy erroneous).
Murænophis helena, *Lacép.* v. p. 631.
Gymnothorax muræna, *Bl. Schn.* p. 525.
Muræna romana, *Shaw, Gen. Zool.* iv. 1, p. 26.
Muræna guttata, *Risso, Eur. Mérid.* iii. 1826, p. 191.
Skeleton: *Rosenthal, Ichthyotom. Taf.* tab. 23; *Owen, Osteol. Catal.* i. p. 14.

Posterior nostrils tubular; anterior nasal tubes of moderate length, their length being about equal to the vertical diameter of the eye. Teeth uniserial. Intermaxillary and mandibular canine teeth but little larger than the lateral teeth; anterior vomerine teeth much the largest, 17–18 teeth on each side of the lower jaw. Gill-opening a small horizontal slit. Snout rather pointed; eye small, two-fifths of the length of the snout, situated above the middle of the length of the cleft of the mouth. Cleft of the mouth wide, its length being about two-thirds of the distance between the angle of the mouth and the gill-opening. Tail a little longer than the body. The length of the head is two-fifths or one-third of that of the trunk. Brown, with large whitish or yellowish spots, each of which contains smaller brown spots. Head and neck brown variegated with whitish. Gill-opening in a small brown spot; tail with a narrow white edge. Sometimes the brown colour predominates, so that nothing but small whitish spots are visible, which are more or less distinctly arranged in rings.

Vert. $\frac{69-71}{72-70}$.

Mediterranean and neighbouring parts of the Atlantic; Mauritius; Australia.

a. Half-grown. Naples. Presented by S. Pratt, Esq.
b, *c*. Half-grown. Malta.
d–*e*. Half-grown. Nice.
f. Half-grown. Cannes. Presented by Dr. Th. Günther.
g. Adult. Cadiz. From the Haslar Collection.
h. Half-grown: stuffed. Mediterranean. Purchased of Mr. Argent.
i. Adult. Madeira. Presented by Sir A. Smith.
k. Adult. Lanzarote. Presented by the Rev. R. T. Lowe.
l. Adult: stuffed. Mauritius.
m. Adult. Australia. Presented by Sir J. Richardson.
n, *o*, *p*, *q*. Adult.
r. Adult: skeleton. Madeira. Presented by Lady Franklin.

2. Muræna augusti.

Muræna guttata, (*Solander, MS.*) *Lowe, Trans. Zool. Soc.* ii. p. 192; *Richards. Voy. Ereb. & Terr. Fish.* p. 90 (not *Risso*).
Thyrsoidea augusti, *Kaup, Apod.* p. 88.
Limamuræna guttata, *Kaup, Apod.* p. 96 (synon. erroneous).
Thyrsoidea atlantica, *Johnson, Proc. Zool. Soc.* 1860, p. 168.

Posterior nostrils tubular, the tubes being only half as long as the anterior, the length of which equals the vertical diameter of the eye. Maxillary teeth biserial, the teeth of the inner series being longer than those of the outer; the other teeth uniserial; but there are sometimes two or three long teeth forming an inner mandibulary series. The anterior vomerine teeth are the longest, nearly twice as long as any of the others. The mouth cannot be shut completely. Gill-opening narrow, not wider than the eye. Snout pointed, narrow; eye small, two-fifths of the length of the snout, a little nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth very wide, its width being contained twice and one-third in the length of the head. Tail longer than the body. The length of the head is two-fifths of that of the trunk. Brownish-black (in spirits); the tail with numerous bluish-white dark-edged dots of the size of a pin's head, disappearing on the anterior parts of the body. Inside of the mouth brown, with similar white dots. Fins without light margin.

Madeira.

a, *b*, *c*–*d*. Adult, half-grown, and young. Presented by J. Y. Johnson, Esq.

Albino variety.

e. Type of *Th. atlantica.* Presented by J. Y. Johnson, Esq.

Richardson describes this species as having the posterior nostrils not tubular. Dr. Kaup, having observed this discrepancy from Solander's description, thought the fish to be different from *M. guttata* (Solander), naming it *M. augusti.* Otherwise he simply copies Richardson's description, as he does throughout his work on the "Apodal Fish." Unfortunately the stuffed example from which Richardson drew up his description cannot be found in the British Museum, if it was there at all (which is very improbable). But there is but little doubt that that specimen was really identical with Solander's fish, the small posterior nasal tubes having become dried and consequently inconspicuous.

3. **Muræna melanotis.**

Limamuræna melanotis, *Kaup, Aale Hamburg. Mus.* p. 27, tab. 4. fig. 3.
Muræna helena, *Troschel, Wiegm. Arch.* 1866, p. 237.

Posterior nostrils tubular; tubes subequal in length, shorter than the eye. Maxillary teeth and, in young examples, also the anterior mandibulary teeth biserial. Canines of moderate length; the mouth can be shut completely. Gill-opening narrow, not wider than the eye, which is small. Snout of moderate length. Cleft of the mouth of moderate width, contained twice and one-half or twice and one-third in the length of the head. Tail longer than the body. The length of the head is contained twice and one-third or twice and one-half in that of the trunk. Brownish black, with numerous round yellowish spots, most of which are smaller than the eye; the spots are sometimes confined to the head and trunk. *A large round black spot round the gill-opening.* Angle of the mouth black.

Tropical parts of the Atlantic; Pacific coast of Panama.

a, b. Adult, fine specimens. Cape Verde Islands. Presented by the Rev. R. T. Lowe.
c–d. Half-grown. South America. Purchased of Mr. Cuming.
e–f. Half-grown. Pacific coast of Panama. From Mr. Salvin's Collection.

4. **Muræna pavonina.**

Richards. Voy. Sulph. Ichthyol. p. 110, pl. 53. figs. 1–6; and *Voy. Ereb. & Terr. Fish.* p. 90.

Posterior nostrils tubular, the tubes being much longer than the anterior, and equal to the vertical diameter of the eye. Maxillary and mandibulary teeth biserial, the inner series being formed by four or five longer teeth *. The other teeth uniserial. Canines of moderate length. The mouth can be shut completely. Gill-opening narrow, not wider than the eye. Snout pointed, narrow. Eye of moderate size, its diameter being more than one-half of the length of the snout, a little nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth wide, its width being two-fifths of the length of the head. Tail longer than the body. The length of the head is contained twice and one-third in that of the trunk. Brownish black, all parts with oval white spots, as large as or larger than the eye. Angle of the mouth and gill-opening black; inside of mouth spotted with black.

---

* Of course these teeth may be absent in other examples.

Southern Seas.

a. Type of the species, 9½ inches long. Presented by Sir J. Richardson.

5. **Muræna pardalis.**

Muræna pardalis, *Schleg. Faun. Japon. Poiss.* p. 268, tab. 119; *Bleek. Act. Soc. Sc. Ind.-Nederl.* iii. *Japan*, iv. p. 30; and *Nat. Tydschr. Ned. Ind.* xvi. p. 206.

Gymnothorax pardalis, *Bleek. Atl. Ichth. Muræn.* p. 86, pl. 25. fig. 1, and pl. 26. fig. 2.

Posterior nostrils tubular, the tubes being more than twice as long as the anterior, the length of which is less than the vertical diameter of the eye. The maxillary and mandibulary teeth are biserial in young examples; but with age the two series melt into each other, constituting a single series composed of large canine-like teeth with small intermediate teeth. The other teeth uniserial; the intermaxillary and anterior vomerine teeth are long canines, which prevent the mouth from being shut. Gill-opening a small horizontal slit, not much wider than the eye. Snout pointed, narrow. Eye of moderate size, two-fifths of the length of the snout, a little nearer to the angle of the mouth than the end of the snout. Cleft of the mouth very wide, its width being at least two-fifths of the length of the head. Tail longer than the body. The length of the head is two-fifths of that of the trunk. Brown, clouded with darker; all parts with numerous whitish or yellowish dark-edged ocelli, which are partly confluent, and much larger on the lower parts than on the upper.

Japan, Cocos, Java; Mauritius.

a. Adult. From Dr. Bleeker's Collection.

b. Adult: stuffed. Mauritius.

6. **Muræna lentiginosa.**

Jenyns, Zool. Beagle, Fish. p. 143.

Posterior and anterior nasal tubes equal in length, not quite as long as the vertical diameter of the eye. Maxillary and mandibulary teeth biserial or uniserial, according to the age of the individual. The teeth on the palate are sometimes entirely lost with age. Anterior canines not much exceeding in length those on the side of the jaws. Gill-openings small, not wider than the eye, two-fifths of the length of the snout, which is rather pointed, narrow. Eye somewhat nearer to the angle of the mouth than to the extremity of the snout. Cleft of the mouth rather more than one-third of the length of the head. Tail as long as the body. The length of the head is one-half of that of the trunk. Yellowish, finely mottled with brown; fins and sides, and especially the lower parts, with white brown-edged ocelli of the size of the eye; fins without white edge. Gill-opening brown.

Galapagos Islands; Pacific coast of Central America.

a. Adult. From Mr. Goodridge's Collection.

B. *Posterior nostrils not tubular*: Gymnothorax.

1. *Body moderately elongate; tail not (or not much) longer than the body; snout of moderate extent.*

a. *Ornamented by well-defined white (in spirits) spots or ocelli.*

a. Maxillary and intermaxillary teeth biserial.

7. **Muræna meleagris.**

Muræna meleagris, *Shaw, Nat. Misc.* pl. 220; *Gen. Zool.* iv. 1, p. 32; *Richards. Voy. Ereb. & Terr. Fish.* p. 93.
Thyrsoidea meleagris, *Kaup, Apod.* p. 91 (copied from *Richardson*).
—— chlorostigma, *Kaup, Apod.* p. 89.
Muræna chlorostigma, *Bleek. Nat. Tyds. Ned. Ind.* xv. p. 160.
Gymnothorax chlorostigma, *Bleek. Atl. Ichth. Mur.* p. 97, pl. 34. fig. 2.

Teeth biserial, except those on the vomer and on the side of the mandible. Canines rather small, and the mouth can be shut completely. Anterior nasal tubes very short. Gill-opening narrow. Snout of moderate length, moderately compressed. Eye small, less than one-half of the length of the snout. Cleft of the mouth wide. Tail rather longer than the body. The length of the head is contained twice and one-third or twice and two-thirds in that of the trunk. Brownish black, with innumerable yellowish dots, which are smaller than the eye.

Vert. 60/60.

Indian and Pacific Oceans.

a. Half-grown. Old Collection. Type of the species.
b. Adult. Zanzibar. Presented by Lieut.-Col. Playfair.
c. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
d. Adult: stuffed. Mauritius.
e. Half-grown. Java. From Dr. Bleeker's Collection.
f. Young. Feejee Islands. Voyage of the 'Herald.'
g. Adult: skeleton. Seychelle Islands. Presented by Prof. E. P. Wright.

8. **Muræna miliaris.**

Murenophis punctata, *Casteln. An. Am. Sud, Poiss*, p. 82, pl. 42. fig. 3.
Thyrsoidea miliaris, *Kaup, Apod.* p. 90.
Gymnothorax scriptus, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 261.

Teeth biserial, except those on the vomer and on the side of the mandible. Canines rather small, and the mouth can be shut completely. Gill-opening as wide as the eye. Snout of moderate length, twice as long as the eye, which is of moderate size. Cleft of the mouth of moderate width, two-fifths of the length of the head. Tail rather longer than the body. The length of the head is two-fifths of that of the trunk. Brown or black, entirely covered with innumerable yellowish dots, the largest of the size of a small pin's head.

Martinique; Cuba.

a. Adult. Cuba. From the Collection of the Zoological Society.

9. **Muræna flavopicta.**

Thyrsoidea flavopicta, *Kaup, Apod.* p. 90.

Teeth biserial, except those on the vomer and on the side of the mandible. Canines small; the mouth cannot be shut completely. Gill-opening rather wider than the eye. Snout of moderate length. Eye small, less than one-half of the length of the snout. Cleft of the mouth wide. Tail rather longer than the body. The length of the head is two-fifths of that of the trunk. Tail black, with innumerable round yellow spots smaller than the eye; towards the trunk the yellow spots are more densely crowded and irregular in shape; and towards and on the head the yellow colour becomes the ground-colour, and the black appears in the form of reticulated lines.

Tropical parts of the Atlantic.

a. Fine specimen. St. Helena. Presented by J. C. Melliss, Esq.

Muræna elaborata, Poey, Mem. Cub. ii. p. 323, and Repert. Fis.-nat. Cub. ii. p. 262, is very closely allied to, and perhaps identical with, this species; it has the vomerine teeth in a double series.

β. Maxillary teeth only biserial.

10. **Muræna stellifera.**

Richards. Voy. Ereb. & Terr. Fish. p. 86.

Teeth uniserial, except those of the maxillary, which is armed with an inner series of four or five strongish teeth. Mandibulary teeth about twenty in number on each side. Canines strong, the jaws not shutting completely. Gill-opening narrow. Snout rather produced and pointed, not quite twice as long as the eye, which is of moderate size. Tail longer than the body. The length of the head is two-fifths of that of the trunk. Brownish, with four regular longitudinal series of pale-blue spots, each of about the size of the eye. Fins with a narrow bluish edge.

Madagascar.

a. Type of the species, 7 inches long. Presented by Dr. J. E. Gray.

Gymnothorax margaritophorus, Bleek. (Ned. Tydschr. Dierk. ii.

p. 53; or Atl. Ichth. Mur. p. 97, pl. 31. fig. 1), appears to be a variety of *M. stellifera*. Like the specimen on which *M. stellifera* was founded, the type of *G. margaritophorus* is a young individual, differing from the other only in having an interrupted broad brown band from the eye along the upper side of the back to above the gill-opening.

a. Eight and a half inches long. Amboyna. From Dr. Bleeker's Collection.

γ. *Maxillary teeth uniserial.*

11. Muræna punctata.

Gymnothorax punctatus, *Bl. Schn.* p. 526.
Calamaia paum, *Russell*, pl. 32.
Muræna punctata, *Richards. Voy. Ereb. & Terr. Ichth.* p. 83 (copied by *Kaup*, *Apod.* p. 64).

Teeth uniserial; mandible with about twenty-three teeth on each side, the four anterior being the largest. Canines moderately developed; the mouth can be shut completely. Anterior nasal tubes rather short, only half as long as the eye. *Gill-opening wide*, at least twice as wide as the eye. Snout compressed, rather produced, pointed, more than twice as long as the eye. Eye of moderate size, situated above the middle of the gape. Cleft of the mouth wide, half as long as the head. Tail rather longer than the body. The length of the head is two-fifths of that of the trunk. Blackish brown, all parts with numerous bluish-white darker-edged ocelli, the largest on the tail being about of the size of the pupil, and those on the anterior part of the body not being much smaller.

Coast of Southern India.

a. Adult. Madras. Collected by Surgeon F. Day.
b. Adult: stuffed.

12. Muræna conspersa.

Gymnothorax conspersus, *Poey*, *Repert. Fis.-nat. Cuba*, ii. p. 259.

Teeth uniserial, mandible with about seventeen teeth on each side; vomerine teeth small, biserial. Anterior teeth large. Tail but little longer than the body. The length of the head is two-fifths of the distance between the gill-opening and vent. The diameter of the eye is somewhat less than one-half of the length of the snout. The whole body is covered with very small blue dots one-sixth of the diameter of the eye, their distance from one another being equal to the diameter of the eye. The anterior and superior half of the head without dots. (*Poey.*)

Cuba.

13. Muræna ocellata.

Gymnothorax ocellatus, *Agass. in Spix*, *Pisc. Bras.* p. 91, tab. 50 *b*.
Muræna meleagris, *Quoy & Gaim. Voy. Freyc. Zool.* p. 245, pl. 52. fig. 2.
—— ocellata, *Jenyns*, *Voy. Beagle*, p. 145; *Richards. Voy. Ereb. & Terr. Ichth.* p. 82, pl. 47. figs. 6–10 (copied by *Kaup*, *Apod.* p. 61).

Neomuræna nigromarginata, *Girard, in U. S. & Mex. Bound. Ichthyol.* p. 76, pl. 41.

?Murenophis variegata, *Casteln. Anim. Amér. Sud, Poiss.* p. 83, pl. 43. fig. 2.

Priodonophis ocellatus, *Kaup, Aale Hamburg. Mus.* p. 22; *Kner, Novara, Fische,* p. 383; *Poey, Repert. Fis.-nat. Cuba,* ii. p. 262.

—— meleagris, *Poey, l. c.*

Teeth uniserial (some of them slightly serrated), mandible with twelve or fourteen teeth on each side, the two anterior being canines of moderate size. Intermaxillary teeth not much larger than maxillary; *there are no teeth on the mesial line between the intermaxillary teeth.* The mouth can be shut completely. Anterior nasal tubes short. Gill-opening narrow. Snout short, thick. Eye rather small. Cleft of the mouth of moderate width. Tail longer than the body. The length of the head is one-half or two-fifths of that of the trunk. Brownish grey, with numerous round white spots irregularly disposed, the largest being about as large as the eye. Dorsal fin with subalternate large white and black spots, anal with a broad black margin.

The *Murænophis variegata* of Castelnau, from Rio Janeiro, is said to lack the black spots on the dorsal fin.

Atlantic coasts of tropical America; Pacific coast of Panama.

a. Adult: stuffed, 44 inches long.
b, c. Half-grown: skins. Jamaica. Purchased of Mr. Parnell.
d. Half-grown. Gulf of Mexico. Presented by Sir J. Richardson.
e, f. Half-grown and young. Bahia.
g. Half-grown. Brazil. Presented by Lord Stuart.
h, i, k–l. Half-grown. South America.
m. Young. Panama. From Mr. Salvin's Collection.
n. Young. From Mr. Stokes's Collection.

14. Muræna dovii.

Teeth uniserial, not serrated; mandible with about eighteen teeth on each side, the two or three anterior being canines of moderate size. Intermaxillary teeth as large as the anterior of the mandible, and *there is a long mesial canine tooth.* The mouth can be shut nearly completely. Gill-opening as large as the eye, which is of moderate size. Snout rather produced, more than twice as long as the eye. Cleft of the mouth wide, two-fifths of the length of the head. Tail longer than the body. The length of the head is scarcely less than one-half of that of the trunk. The dorsal fin begins considerably in advance of the gill-opening. Brownish black, with bluish dark-edged ocelli smaller than the eye, rather distant from one another, and not very numerous. *Fins coloured like the body.*

Panama.

a. Twenty-one inches long. Presented by Captain Dow.

15. Muræna nudivomer.

Günth. in Fish. Zanz. p. 127, pl. 18.

The anterior intermaxillary and mandibulary teeth are biserial, the others uniserial (some of the teeth slightly serrated); the vomer is toothless (in the only example known); mandible with about twenty teeth on each side; canines small. Eye small. Snout of moderate length. Cleft of the mouth of moderate width. Tail apparently somewhat longer than the body. The length of the head is two-fifths of that of the trunk. The anterior half of the fish is yellow, with small brown spots and lines; whilst on the posterior half the brown may be regarded as the ground-colour, ornamented with ovate yellow spots larger than the eye, and so closely arranged that the brown colour forms merely a continuous network of lines.

Zanzibar.

a. Type of the species, stuffed, 34 inches long. From Lieut.-Col. Playfair's Collection.
b. Adult: stuffed. From Lieut.-Col. Playfair's Collection.

b. *Species ornamented by well-defined black cross bands.*

16. Muræna rüppellii.

Muræna colubrina, *Lacép.* v. pp. 627, 641, 642, pl. 19. fig. 1 (not *Boddaert*); *Richards. Voy. Ereb. & Terr. Fish.* p. 88; *Bleek. Nat. Tydschr. Ned. Ind.* vi. p. 335.
—— reticulata, *Rüpp. Atl. Fisch.* p. 117 (not *Bl.*).
Dalophis rüpelliæ, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 213.
Thyrsoidea colubrina, *Kaup, Apod.* p. 84 (copied from *Richardson*).
Gymnothorax reticularis, *Bleek. Atl. Ichth. Mur.* p. 98, tab. 33. fig. 1; tab. 37. fig. 4; and tab. 39. fig. 2 (not *Bloch*).

Teeth uniserial, younger examples sometimes with one or two additional teeth, forming an inner maxillary series; mandibulary teeth 20 to 23; canines moderately developed; the mouth can be shut completely. Anterior nasal tubes much shorter than the vertical diameter of the eye. Gill-opening as wide as the eye. Snout slightly compressed, of moderate length; eye of moderate size, rather more than half the length of the snout, situated nearly above the middle of the cleft of the mouth. Cleft of the mouth rather wide, its length being contained twice and two-thirds in that of the head. Tail longer than the body; the length of the head is contained from twice and one-third to twice and two-thirds in that of the trunk. *Head, body, and fins encircled by 18 or 20 complete, well-defined black rings, which are considerably narrower than the interspaces.* With age the dorsal part of each ring becomes somewhat diffused. *The three rings on the head very distinct (none on the end of the snout)*; the first through the eye, the second behind the cleft of the mouth, the third in front of or across the gill-opening.

East-Indian archipelago.

a, *b*. Adult. Moluccas.
c, *d*. Half-grown and young. Borneo.

e. Half-grown. Presented by the Royal College of Surgeons.

This species has been confounded by Lacépède with the *Muræna colubrina* of previous authors, which is an Ophiuroid Eel, and by Bleeker with *Gymnothorax reticulata* of Bloch.

17. Muræna petelli.

Muræna nubila, *Richards. Voy. Ereb. & Terr. Fish.* p. 81 (spec. from Mauritius).
—— petelli, *Bleek. Nat. Tyds. Ned. Ind.* xi. p. 84; or *Act. Soc. Sc. Ind.-Nederl.* ii. *Amboyna*, viii. p. 92.
? Muræna interrupta, *Kaup, Apod.* p. 67, fig. 51.
Gymnothorax petelli, *Bleek. Atl. Ichth. Muræn.* p. 99, pl. 32. fig. 1.

Teeth uniserial, young examples with some additional teeth forming an inner maxillary series; mandibulary teeth about 23 on each side. Canines moderately developed, the mouth cannot be shut completely. Gill-opening not wider than the eye, which is of moderate size, situated somewhat nearer to the end of the snout than to the angle of the mouth. Snout rather produced, not twice as long as the eye. Cleft of the mouth wide, its length being contained twice and one-fourth in that of the head. Tail longer than the body; the length of the head is one-third of that of the trunk. *Brown, with from* 17 *to* 18 *dark cross bands, broader than the interspaces; the first, indistinct, on the end of the snout; the third, very distinct, at the commencement of the dorsal fin.* In old examples most of the bands are broken up into spots, but the anterior dorsal bands remain distinct.

Indian Ocean and archipelago. Red Sea?

a. Type of the species, 19 inches long. Java. From Dr. Bleeker's Collection.
b. Stuffed, 44 inches long. Mauritius. From Dr. Janvier's Collection.

18. Muræna reticularis.

Gymnothorax reticularis, *Bl. Ausl. Fisch.* ix. p. 85, pl. 416; *Bl. Schn.* p. 528.
—— reticulatus, *Bl. Schn.* p. 528.
Murænophis reticularis, *Lacép.* v. pp. 628, 642, 643.
Muræna reticulata, *Richards. Voy. Ereb. & Terr. Fish.* p. 82 (cop. by *Kaup, Apod.* p. 60, fig. 49).
—— minor, *Schleg. Faun. Japon. Poiss.* p. 269, pl. 115. fig. 2.
Priodonophis minor, *Bleck. Verh. Bat. Gen.* xxvi. p. 123; *Kner, Novara, Fisch.* p. 382.

Teeth uniserial (some of them slightly serrated); mandibulary teeth thirteen; canines very small; the mouth can be shut completely. Anterior nasal tubes very short. Width of the eye and gill-opening nearly equal. Snout scarcely compressed, rather short; eye of moderate size, two-thirds the length of the snout, situated somewhat nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth of moderate width, one-third of the length of the head. Tail longer than the body; *the length of the* *head is contained twice and one-third in that of the trunk. Body with about* 16 *black cross bands, which are rather broader than the interspaces*; their ventral portion is well defined, but the dorsal half is more diffuse, whilst the part on the dorsal fin is again well marked. The first distinct ventral band is behind the gill-opening, *whilst the head and the back are closely spotted and dotted with brown.*

China; Japan.

a. Thirteen inches long. China Seas. Presented by Sir J. Richardson.
b. Half-grown. Japan. From Dr. Bleeker's Collection.

Bleeker erroneously refers Bloch's *G. reticularis* to the preceding species. Our examples agree very well with the figure given by Bloch, which is very accurate.

19. **Muræna punctato-fasciata.**

Muræna catenata, *Bleek. Act. Soc. Ind.-Neerl.* i. *Amboyna*, p. 66 (not synon.).
Gymnothorax punctato-fasciatus, *Bleek. Atl. Ichth. Mur.* p. 99, tab. 31. fig. 4.

Teeth uniserial; mandibulary teeth 16–17; canines very small; the mouth can be shut completely. Anterior nasal tubes very short. Width of the gill-opening rather more than that of the eye. Snout scarcely compressed, short; eye of moderate size, two-thirds of the length of the snout, situated somewhat nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth of moderate width, one-third of the length of the head. Tail longer than the body; *the length of the head is one-third, or a little less than one-third, of that of the trunk. Body with from* 28 *to* 33 *irregular more or less complete brown rings. Head and the interspaces between the bands closely dotted and spotted with brown.*

East-Indian archipelago.

a. Adult. Amboyna. From Dr. Bleeker's Collection. Type of the species.
b–c. Adult and young. Amboyna. Purchased of Mr. Frank.
d–e. Adult. From the Collection of Dr. van Lidth de Jeude.

c. *Species ornamented by well-defined polygonal or round black spots.*

20. **Muræna tessellata.**

? Gymnothorax favagineus, *Bl. Schn.* p. 525, tab. 105.
? Muræna favaginea, *Cuv. Règne Anim.*
Thærodontis reticulata, *M'Clell. Calc. Journ. Nat. Hist.* v. 1845, pp. 188, 216, pl. 7. fig. 1 (not *Bl. Schn.*).
Muræna tessellata, *Richards. Ichth. Sulph.* p. 109, pl. 55. figs. 5–8; and *Ereb. & Terr. Fish.* p. 88; *Bleek. Nat. Tydschr. Ned. Ind.* v. p. 530, or *Verh. Bat. Gen.* xxv. *Muræn.* p. 74.
—— isingteena, *Richards. Ichth. Sulph.* p. 108, pl. 48. fig. 1; and *Ereb. & Terr. Fish.* p. 86.
—— python, *Kaup, Apod.* p. 68, fig. 52.
—— favaginea, *Kaup, Apod.* p. 68, fig. 53.

Thyrsoidea tessellata, *Kaup, Apod.* p. 76.
—— isingleena, *Kaup, Apod.* p. 75, fig. 57.
Gymnothorax isingteena, *Bleek. Atl. Ichth. Mur.* p. 92, pl. 37. fig. 1.
—— tessellatus, *Bleek. l. c.* p. 93, pl. 27. fig. 3, and pl. 28. fig. 1.

Teeth uniserial, younger examples sometimes with two or three additional teeth, forming an inner maxillary series. Canines moderately developed; the mouth can be shut completely. Anterior nasal tubes much shorter than the vertical diameter of the eye. Gill-opening wider than the eye. Snout compressed, of moderate length; *eye rather small*, rather less than half the length of the snout, situated above the middle of the cleft of the mouth. Cleft of the mouth wide, its width being contained twice and one-third in the length of the head. Tail nearly as long as the body; *the length of the head is one-third of that of the trunk.* Head, body, and fins with large polygonal or rounded black spots separated by narrow white lines (*tessellata*) or by distinct interspaces of the ground-colour, all or most of the spots being wider than the interspaces (*isingteena*).

Indian Ocean and archipelago.

α. var. *tessellata.*

a. Large specimen. Africa. Presented by — Nimmo, Esq.—Type of *M. python*, Kaup.
b. Fine specimen. Zanzibar. Presented by Lieut.-Col. Playfair.
c. Half-grown: stuffed. Zanzibar. Presented by Lieut.-Col. Playfair.
d. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
e. Young. Presented by Sir J. Richardson.—Type of *M. tessellata.*

β. var. *intermedia.*

f. Adult: stuffed. From the Collection of the Zoological Society.
g. Adult. From Dr. Kaup's Collection.

γ. var. *isingteena.*

h. Adult: stuffed. China. Presented by J. R. Reeves, Esq.—One of the types of *M. isingteena.*
i. Half-grown. China. Presented by J. R. Reeves, Esq.—One of the types of *M. isingteena.*
k. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
l. Half-grown: stuffed. Mauritius. From Dr. Janvier's Collection.
m. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
n. Skull.

21. **Muræna reevesii.**

Richards. Ichthyol. Sulph. p. 109, pl. 48. fig. 2.

Teeth uniserial, without basal lobe; there are about 17 on each side of the mandible. Canines of moderate size, the jaws shutting completely. Anterior nasal tubes short; gill-opening not wider than the eye. Snout compressed, rather short; *eye of moderate size,* its diameter being more than one-half of the length of the snout, situated nearer to the end of the snout than to the corner of the mouth. Cleft of the mouth wide, its length being contained twice and one-third or twice and one-sixth in that of the head. Tail longer than the body; the length of the head is contained twice and one-third in that of the trunk. *Dark-brown, with several series of indistinct black round spots, longitudinally arranged, and of about the size of the eye; head with spots similar to those of the body in size and form; fins without light margin.*

China; Japan.

a, b, c. Adult. Japan. Purchased of Mr. Jamrach.

22. **Muræna tigrina.**

Rüppell, Atl. p. 118, taf. 30. fig. 2; *Kaup, Apod.* p. 69.

Teeth uniserial, except the vomerine series, which is forked in front. Tail nearly twice as long as body. Yellowish, with three alternate longitudinal series of round brown spots, those of the middle series being the largest.

Red Sea.

23. **Muræna fimbriata.**

Muræna fimbriata, *Bennett, Proc. Comm. Zool. Soc.* i. 1831, p. 168.
—— bullata, *Richards. Ereb. & Terr. Ichth.* p. 86 (cop. by *Kaup, Apod.* p. 81, fig. 60).
—— isingleena, *Bleek. Nat. Tyds. Ned. Ind.* ix. p. 277 (not *Richards.*).
—— isingleenoides, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 48.
Gymnothorax isingleenoides, *Bleek. Atl. Ichth. Mur.* p. 91, pl. 35. fig. 1, pl. 36. fig. 1 (coloration of anal fin incorrect).

Teeth uniserial, without basal lobe; younger examples sometimes with two or three additional teeth, forming an inner maxillary series. Canines well developed, but the mouth can be shut nearly completely. Anterior nasal tubes much shorter than the vertical diameter of the eye. Gill-opening not wider than the eye. Snout narrow, somewhat produced; *eye of moderate size,* half the length of the snout, situated above the middle of the cleft of the mouth. Tail a little longer than the body; the length of the head is contained twice and one-fourth or twice and one-third in that of the trunk. *Body and tail with three or more more or less regular longitudinal series of round black spots,* most of which are larger than the eye, but smaller than the interspaces of the ground-colour. *Fins with a white margin. Head with small black spots.*

East-Indian archipelago.

a. Young. Borneo. Presented by Sir J. Richardson.—Type of *M. bullata.*

b. Adult. Amboyna. Purchased of Hr. Frank.

c. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. isingleenoides.*

d, e. Adult. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.

f. Young. Port Essington. From the Haslar Collection.

g. Half-grown; type of the species. Mauritius. From the Collection of the Zoological Society.

h. Half-grown. Presented by Sir A. Smith.

24. **Muræna microspila.**

Gymnothorax bullatus, *Bleek. Atl. Ichth. Mur.* p. 91, pl. 27. fig. 2 (3 on plate), pl. 43. fig. 3 (not synonymy).

Teeth uniserial, without basal lobe; there are about 20 on each side of the mandible. Canines rather small, the jaws shutting completely. The length of the anterior nasal tubes is nearly equal to the vertical diameter of the eye. Gill-opening as wide as the eye. Snout rather narrow and produced; *eye small*, two-fifths of the length of the snout, situated above the middle of the cleft of the mouth, which is wide, contained twice and one-sixth in the length of the head. Tail as long as the body; *the length of the head is contained twice and two-thirds in that of the trunk. Body and tail with two or three longitudinal series of round black spots*, those of the dorsal series being much larger than, and those of the middle series about as large as, the eye. *Head nearly immaculate; fins without white margin.*

East-Indian archipelago.

a. One of the typical examples of Bleeker's *Muræna bullata.*

25. **Muræna melanospila.**

Muræna melanospilos, *Bleek. Nat. Tydschr. Ned. Ind.* ix. p. 279.
Gymnothorax melanospilos, *Bleek. Atl. Ichth. Mur.* p. 90, pl. 42. fig. 1.

Teeth uniserial, without basal lobe; there are about 19 on each side of the mandible. Canines much larger than the other teeth, and the jaws do not shut. Anterior nasal tubes very short. Gill-opening wider than the eye. *Snout short and compressed; eye small*, one-half of the length of the snout, situated above the middle of the cleft of the mouth, the length of which is contained twice and two-thirds in that of the head. Tail a little longer than the body; the length of the head is one-third of that of the trunk. *Brown, body and tail with round or oval black spots, generally larger than the eye, and longitudinally arranged. Spots on the head much the smallest. Fins with a narrow whitish edge.*

Sumatra and Booro.

a. Type of the species. From Dr. Bleeker's Collection.

26. **Muræna polyophthalmus.**

Muræna polyophthalmus, *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Celebes,* x. p. 15.

Gymnothorax polyophthalmus, *Bleek. Atl. Ichth. Mur.* p. 96, pl. 30. fig. 3.

Known from a single very young example only.

Teeth biserial. Snout of moderate length. Tail a little longer than the body; the length of the head is two-fifths of that of the trunk. The entire fish is ornamented with round brown spots of about the size of the eye, forming three irregular longitudinal series. *The larger of these spots are ocelli, with a yellow centre.*

Celebes.

a. Type of the species, 4½ inches long. From Dr. Bleeker's Collection.

d. *Species ornamented by yellowish lines, forming a network.*

27. Muræna undulata.

Murænophis undulata, *Lacép.* v. pp. 629, 644.

Muræna cancellata, *Richards. Voy. Ereb. & Terr. Fish.* p. 87, pl. 46. figs. 1–5; *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 74, or *Nat. Tydschr. Ned. Ind.* v. p. 531, and viii. p. 326.

—— valenciennii, *Eyd. & Soul. Voy. Bonite, Poiss.* p. 207, pl. 8. fig. 1.

—— agassizi, *Bleek. Nat. Tyds. Ned. Ind.* viii. p. 458.

Thyrsoidea cancellata, *Kaup, Apod.* p. 76, fig 59 (description copied from *Richardson*).

Gymnothorax cancellatus, *Bleek. Atl. Ichth. Mur.* p. 93, tab. 32. fig. 3, tab. 33. fig. 2, tab. 39. fig. 1; *Kner, Novara, Fisch.* p. 384.

—— agassizi, *Bleek. l. c.* p. 95, tab. 41. fig. 2.

Muræna nubila, *Günth. Fish. Zanz.* p. 127 (not *Rich.*).

Teeth uniserial, sometimes two additional teeth forming an inner maxillary series; mandibulary teeth from twenty-six to thirty in number on each side (in adult examples); canines strong, normally four pairs in the lower jaw; also two of the maxillary teeth are canines. *The mouth cannot be shut completely.* Anterior nasal tubes short. Gill-opening not wider than the eye. *Snout produced, pointed. Eye rather large,* more than half the length of the snout, situated above the middle of the cleft of the mouth. Cleft of the mouth very wide, one-half, or nearly one-half, of the length of the head. Tail longer than the body. The length of the head is contained twice and one-third in that of the trunk. Ground-colour brown, or brownish black; head and anterior part of trunk with irregular, more or less distinct dark spots. Undulated and partly reticulated, chiefly subvertical yellowish lines over the body and fins, and becoming more distinct towards and on the tail. These lines are sometimes limited to the posterior part of the tail, and the body is irregularly mottled with brown (*M. agassizii*). Gill-opening without black spot; *fins not white-edged.*

Vert. 64/68.

Indian and Pacific Oceans.

a. Many adult and half-grown specimens, in spirits and stuffed.

Zanzibar. From the Collections of Lieut.-Col. Playfair and Dr. Kirk.
b. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
c. Adult. Cocos Islands. From Dr. Bleeker's Collection.—Type of *M. agassizi*.
d. Half-grown. Sandwich Islands. Presented by Lieut. Strickland.
e. Adult: stuffed. From the Collection of the Zoological Society.
f, g. Young. Presented by Sir A. Smith.
h. Adult: skeleton. Zanzibar. Presented by Lieut.-Col. Playfair.

A very young example, which is now almost destroyed, has been named by Dr. Bleeker *Muræna blochii*, Verh. Bat. Gen. xxv. Mur. p. 49, or Nat. Tyds. Ned. Ind. vii. p. 102. The description reappears in Atl. Ichth. Mur. p. 102, and a figure is added on pl. 36, fig. 2. This specimen appears to have been a young of *M. undulata*.

a. Type of *M. blochii*. From Dr. Bleeker's Collection.

28. **Muræna macassariensis.**

Muræna thyrsoidea, *Richards. Voy. Sulph. Fish.* tab. 49. fig. 1 (not descript.).
Gymnothorax makassariensis, *Bleek. Ned. Tydschr. Dierk.* i. p. 168; or *Atl. Ichth. Mur.* p. 104, pl. 37. fig. 3.
?? Muræna elegantissima, *Kaup, Apod.* p. 67.
Thyrsoidea macrops, *Kaup, Apod.* p. 74.

Teeth uniserial, sometimes two additional teeth forming an inner maxillary series; mandibulary teeth about twenty on each side; canines rather strong, *but the mouth can be shut completely*. Anterior nasal tubes short. Gill-openings narrower than the eye. Snout somewhat produced, not twice so long as *the eye, which is large* and situated above the middle of the cleft of the mouth. Cleft of the mouth very wide, one-half of the length of the head. Tail scarcely longer than the body. The length of the head is contained twice and two-thirds in that of the trunk. Brown, with very fine vermiculated white lines, formingan irregular network, the area of each mesh darker in the centre. *Gill-opening without black spot. Fins with a narrow white margin.*

China; Celebes; North Australia.

a. Adult. China.
b. Young. China. Presented by Sir E. Belcher.—Type of *Th. macrops*.
c, d–e. Half-grown. Cape York. Collected by Hr. Dämel.

29. **Muræna formosa.**

Gymnothorax formosus, *Bleek. Ned. Tydschr. Dierk.* ii. p. 51; or *Atl. Ichth. Mur.* p. 94, pl. 30. fig. 1.
—— rhodocephalus, *Bleek. l. c.* 1°, p. 50; or *l. c.* 2°, p. 93, pl. 29. fig. 2 (young).

Teeth uniserial, sometimes a few additional teeth form an inner maxillary series; mandibulary teeth about twenty on each side; canines rather strong, but the mouth can be shut completely. Gill-openings narrower than the eye. Snout of moderate length, not twice as long as *the eye, which is rather large* and situated somewhat nearer to the end of the snout than to the angle of the mouth. Cleft of the mouth very wide, one-half of the length of the head. Tail scarcely longer than the body. The length of the head is one-third of that of the trunk. Tail with large polygonal black spots, separated by an irregular network of yellowish lines. These large spots are broken up into irregular smaller ones, the nuchal region being densely covered with very small spots. A brown blotch across the head; snout unspotted. *A deep-brown spot on the gill-opening and the angle of the mouth. Fins with a yellow margin.*

Ceram and Amboyna.

a. Type of the species, 19 inches long. Ceram. From Dr. Bleeker's Collection.

b. Type of *G. rhodocephalus*, 9½ inches long. Amboyna. From Dr. Bleeker's Collection.

30. **Muræna pseudothyrscidea.**

Muræna pseudothyrsoidea, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 778, or *Verh. Bat. Gen.* xxv. *Mur.* p. 44; ? *Kaup, Apod.* p. 65.

Gymnothorax pseudothyrsoideus, *Bleek. Atl. Ichth. Mur.* p. 104, pl. 46. fig. 2.

Teeth uniserial; mandible with about eighteen teeth on each side; canines moderately developed; the mouth cannot be shut completely. Gill-openings not larger than the eye. Snout of moderate length, twice as long as the *eye, which is rather small*, and nearer to the end of the snout than to the angle of the mouth. Cleft of the mouth wide, its length being contained twice and one-fourth in that of the head. Tail not quite so long as the body. The length of the head is two-fifths of that of the trunk. Brown, with very fine vermiculated white lines, forming an irregular network. *Gill-opening without black spot; fins without white margin.*

Celebes; Amboyna.

a. Type of the species. Celebes. From Dr. Bleeker's Collection.

e. *Body with dark or light markings, which are not well defined, and more or less irregular.*

a. Maxillary teeth biserial.

31. **Muræna tile.**

Murænophis tile, *Ham. Buch. Fish. Gang.* pp. 18, 363.

Lycodontis literata, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 186, pl. 7. fig. 2.

—— punctata, *M'Clell. l. c.* p. 187, fig. 3.

Strophidon literata, *M'Clell. l. c.* pp. 203, 215.

—— punctata, *M'Clell. l. c.* pp. 203, 215.

—— maculata, *M'Clell. l. c.* pl. 8. fig. 1.

Muræna vermiculata, *Richards. Voy. Ereb. & Terr. Fish.* p. 92.
—— gracilis, *Richards. l. c.*
—— punctata *et* literata, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 42.
—— tile, *Bleek. l. c. Beng.* p. 159; or *Nat. Tyds. Ned. Ind.* ix. p. 427.
Thyrsoidea tile, *Kaup, Apod.* p. 93 (copied from *Richards.*), fig. 66.
Gymnothorax tile, *Bleek. Atl. Ichth. Mur.* p. 97, tab. 34. fig. 1; *Kner, Novara, Fische*, p. 335.

All the teeth more or less distinctly biserial, except the lateral of the mandible, which are uniserial. Canine teeth small. Anterior nasal tubes very short. Snout of moderate length, rather obtuse. Eye of moderate size, one-half or two-thirds of the length of the snout, situated somewhat nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth of moderate width. Gill-opening about as wide as the eye. Tail as long as, or shorter than, the body. The length of the head is one-third of that of the trunk. Brown or brownish black, with numerous irregular very small light specks, unequal in size. These specks disappear more or less with age on the anterior part of the body, but are distinct on the dorsal fin and tail.

Indian Ocean.

a, b. Several adult and half-grown specimens. Calcutta.
c. Adult. India. Presented by General Hardwicke.—Type of *M. vermicularis.*
d, e. Half-grown. India.—Types of *M. gracilis.*
f. Adult. East Indies. From Dr. Bleeker's Collection.

32. Muræna thyrsoidea.

Muræna thyrsoidea, *Richards. Voy. Sulph. Ichth.* p. 111 (not fig.), and *Voy. Ereb. & Terr.* p. 90; *Cant. Mal. Fish.* p. 330, pl. 5. f. 5.
—— griseobadia, *Richards. Voy. Ereb. & Terr. Fish.* p. 89.
—— prosopeion, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 300; or *Verh. Bat. Gen.* xxv. *Mur.* p. 73.
Thyrsoidea griseobadia, *Kaup, Apod.* p. 74 (cop. *Richards.*).
—— arenata, *Kaup, Apod.* p. 85 (cop. *Richards.*).
Gymnothorax prosopeion, *Bleek. Atl. Ichth. Mur.* p. 88, pl. 39. fig. 3.

Skin with scale-pouches. Teeth short, biserial, except on the intermaxillary and the sides of the mandible. Anterior nasal tubes very short. Gill-opening rather wider than the eye. *Snout short, obtuse; eye very small.* Tail a little longer than the body; the length of the head is one-third of that of the trunk; fins low. Brownish, all over minutely dotted and speckled with brown and white.

East-Indian archipelago; China; Tonga Islands.

a. Twenty-six inches long. China. Presented by J. R. Reeves, Esq.—Type of the description of *M. thyrsoidea*, but not of the figure.
b. Skin. Pinang. From Dr. Cantor's Collection.

Bleeker represents this fish (*G. prosopeion*) as having the anal fin provided with a yellow edge and submarginal black band. The yellow edge is not mentioned in the description, nor is it visible in our specimens; and the black band is, in reality, a longitudinal fold, visible in many specimens of *Muræna*.

33. Muræna buroënsis.

Muræna buroënsis, *Bleek. Nat. Tyds. Ned. Ind.* xiii. p. 79.
Gymnothorax buroënsis, *Bleek. Atl. Ichth. Mur.* p. 90, pl. 46. fig. 1 (dentition faultily represented).
—— griseo-badius, *Bleek. l. c.* p. 105, pl. 31. fig. 2 (not *Richards.*).

Skin with scale-pouches. Teeth short, biserial, except those on the vomer and the sides of the mandible. Gill-opening rather wider than the eye. *Snout short; eye small.* Tail about as long as the body; the length of the head is two-fifths or one-third of that of the trunk. Brown, with numerous more or less distinct, sometimes entirely wanting, small black spots. Fins without white margin.

East-Indian archipelago.

a. Type of the species, 13 inches long. From Dr. Bleeker's Collection.
b. Ten inches long. From Dr. Bleeker's Collection as *M. griseobadia*.

34. Muræna polyuranodon.

Muræna polyuranodon, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 248, or *Verh. Bat. Gen.* xxv. *Mur.* p. 75.
Murænoblenna tigrina, *Kaup, Apod.* p. 98 (part.).
Polyuranodon kuhlii, *Kaup, Apod.* p. 96.
Gymnothorax polyuranodon, *Bleek. Atl. Ichth. Mur.* p. 89, pl. 30. fig. 2.

All the teeth bi- or triserial. Gill-opening a little wider than the eye. Anterior teeth scarcely larger than the following. Snout of moderate length; eye small, half the length of the snout, situated above the middle of the cleft of the mouth. *Tail shorter than the body; the length of the head is one-fourth of that of the trunk.* Yellowish brown, with irregular rounded, more or less confluent black spots; the spots coalesce into longitudinal bands on the head.

East-Indian archipelago (fresh water).

a. Type of the species. From Dr. Bleeker's Collection.

35. Muræna duivenbodii.

Muræna duivenbodei, *Bleek. Nat. Tyds. Ned. Ind.* x. p. 385.
Gymnothorax duivenbodei, *Bleek. Atl. Ichth. Mur.* p. 89, pl. 25. fig. 1.

Maxillary teeth biserial, the others uniserial. Intermaxillary and anterior mandibulary teeth much smaller than the mesial canines. The mouth cannot be shut completely. Snout not twice as long as the eye, which is of moderate size, and somewhat nearer to the end of the snout than to the angle of the mouth. Gill-opening as wide as the eye. Tail as long as the body; the length of the head is two-fifths of that of the trunk. Brownish, with rather distant irregular ovate or transverse darker spots. Fins without light margin.

Ternate.

a. Type of the species, 258 millims. long. From Dr. Bleeker's Collection.

36. Muræna anatina.

Lowe, Trans. Zool. Soc. ii. p. 192.

Teeth irregularly biserial, the inner series composed of long, slender teeth; vomerine teeth uniserial. The jaws cannot be shut. *Snout produced, narrow, subspatulate*; eye of moderate size, two-fifths of the length of the snout, nearer to the end of the snout than to the angle of the mouth. Nasal tubes short. *Cleft of the mouth exceedingly wide, rather more than one-half of the length of the head* Gill-opening narrower than the eye. Dorsal fin rather low. Tail rather longer than the body; the length of the head is a little less than one-half of that of the trunk. Brownish black, with small, irregular, pale greyish spots in moderate number, and longitudinally arranged; the largest are sometimes twice the size of the eye, the smallest mere dots; each spot is again marbled with darker. Head brownish yellow, with indistinct yellowish dots above.

Madeira.

a. Presented by Th. Moore, Esq.

37. Muræna sanctæ helenæ.

Allied to *M. anatina*.

Teeth irregularly biserial, the inner series composed of long, slender teeth; vomerine teeth uniserial. The jaws cannot be shut completely. Snout rather produced and narrow; eye rather small. two-fifths of the length of the snout, *above the middle of the gape*. Anterior nasal tubes shorter than the vertical diameter of the eye. *Cleft of the mouth wide, its length being contained twice and one-fourth in that of the head*. Gill-opening as wide as the eye. The dorsal fin begins somewhat in advance of the gill-opening, and is moderately developed. Tail longer than the body; the length of the head is two-fifths of that of the trunk. Brownish black, with numerous rather irregular pale greyish spots; the largest are about of the size of the eye, the smallest mere dots; each spot is again marbled with darker; the smaller and larger spots are mixed with each other.

St. Helena.

a. Fine specimen. Presented by J. C. Melliss, Esq.

38. Muræna irregularis.

Thyrsoidea irregularis, *Kaup, Apod.* p. 95.

Intermaxillary, maxillary, and vomerine teeth biserial. Brown, with large black spots irregularly dispersed over the body; fins yellowish. (*Kaup.*)

Brazils.

β. *Maxillary teeth uniserial.*

39. **Muræna picta.**

? Conger indicus maculosus, *Willughby, Append.* p. 24, tab. G 10. fig. 1.

Muræna picta, *Ahl, De Mur. et Ophichth. in Thunb. Dissert.* iii. p. 6, tab. 2. fig. 2; *Günth. in Fish. Zanz.* p. 126.

Gymnothorax pictus, *Bl. Schn.* p. 529; *Bleek. Atl. Ichth. Muræn.* p. 87, tab. 26. figs. 3, 4, tab. 28. fig. 3, tab. 29. fig. 1, tab. 45. fig. 3; *Kner, Novara, Fisch.* p. 384.

Murænophis pantherina, *Lacép.* v. pp. 628, 641, 643.

Muræna variegata (prat-bernon), *Quoy & Gaim. Voy. Uran. Zool.* p. 246, pl. 52. fig. 1.

—— lita, *Richards. Voy. Ereb. & Terr. Fish.* p. 84; *Bleek. Nat. Tydschr. Ned. Ind.* iii. p. 294, and x. p. 383, or *Verh. Bat. Gen.* xxv. *Muræn.* p. 47.

—— siderea, *Richards. l. c.* p. 85, pl. 48. figs. 1–5.

—— pfeifferi, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 173; or *Verh. Bat. Gen.* xxv. *Muræn.* p. 72.

Sidera pfeifferi, *Kaup, Apod.* p. 70.

—— pantherina, *Kaup, Apod.* p. 71.

Gymnothorax pantherinus, *Bleek. Ned. Tydschr. Dierk.* i. p. 152.

Maxillary and intermaxillary teeth in a single series; *only one or two anterior vomerine teeth, which are not subulate, and not larger than the intermaxillary teeth.* The vomerine series is generally distinctly bifurcate anteriorly. Mandibulary teeth uniserial, only the anterior subbiserial. There are no distinct canine teeth. Anterior nasal tubes not quite as long as the vertical diameter of the eye. Snout of moderate length; eye small, less than one-half of the length of the snout, situated above the middle of the cleft of the mouth, the length of which is nearly one-third of that of the head. Tail about as long as the body; the length of the head is contained twice and two-thirds in that of the trunk. Brownish grey, with an infinite number of very small black spots separated by a fine light network; sometimes the spots are more or less confluent into larger irregular spots, so that the fish appears to be marbled with brown. *Young* examples light coloured, with black ring-shaped figures, traces of which are sometimes still visible in larger examples, in which some of the dots are grouped together so as to form obsolete spots.

Indian and Pacific Oceans.

a, *b*, *c–d*. Adult, half-grown, and young. Zanzibar.

e. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.

f. Half-grown. Moluccas.—Type of *M. lita*.

g, *h*, *i*. Adult and half-grown. East-Indian archipelago.

k. Young. Sumatra. Presented by Sir T. S. Raffles.

l. Adult. Amboyna. Purchased.

m. Young. Borneo.

n. Half-grown. Celebes. From Dr. Bleeker's Collection.—Type of *M. pfeifferi*.

o. Half-grown. Australia. Presented by J. B. Jukes, Esq.—Type of *M. siderea*.
p, *q*. Adult and young. Australia.
r. Adult. Samoa Islands. From the Godeffroy Collection.
s–t. Young. Feejee Islands. Voyage of the 'Herald.'
u. Young.

40. **Muræna nubila.**

Muræna nubila, *Richards. Voy. Ereb. & Terr.* p. 81, pl. 46. figs. 6–10 (cop. by *Kaup, Apod.* p. 57, fig. 48).
—— similis, *Richards. l. c.* p. 83 (cop. by *Kaup. Apod.* p. 63).
—— kidako, *Schleg. Faun. Japon. Poiss.* p. 266, pl. 117.
Gymnothorax sagenodeta, *Bleek. Atl. Ichth. Mur.* p. 100, pl. 40. fig. 4 (not synon.) (young).
—— chilospilus, *Bleek. Ned. Tydschr. Dierk.* ii. p. 52; or *Atl. Ichth. Mur.* p. 103, pl. 44. fig. 1 (young).

Skin smooth. Teeth uniserial, without basal lobe; mandible with from 14 to 16 on each side; canines moderately developed, the mouth shutting completely. The length of the anterior nasal tubes is rather less than the vertical diameter of the eye. Snout compressed, somewhat produced; eye small, one-half or two-fifths of the length of the snout, situated a little nearer to the angle of the mouth than to the end of the snout. Gill-opening as wide as the eye. Tail a little longer than the body; the length of the head is contained twice and one-half or twice and two-thirds in that of the trunk. *Gill-opening without large black spot.* Brownish, with irregular dark brown blotches, more or less confluent into transverse band-like spots. *Anal fin with a black and white margin. Angle of the mouth brown, with a more or less distinct white spot in front.*

East-Indian archipelago; Japan; Norfolk Islands.

a. Adult. Norfolk Islands. Presented by Sir J. Richardson.—Type of the species.
b. Adult. Japan.—Type of *M. similis*.
c. Adult. Japan. Purchased of Mr. Jamrach.
d. Adult. Formosa. From Consul Swinhoe's Collection.
e. Young. Amboyna. From Dr. Bleeker's Collection as *M. sagenodeta*.
f. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. chilospilus*.

Muræna mülleri, Kaup, Apod. p. 69, fig. 54, from the East-Indian archipelago.—I should not hesitate to unite this with *M. nubila* if the author had not stated that he has found twenty-two mandibulary teeth in the specimen examined by him. Dr. Bleeker says that he was unable to find the typical example in the Leyden Museum.

41. **Muræna sagenodeta.**

Richards. Voy. Ereb. & Terr. Fish. p. 81; *Kaup, Apod.* p. 59.

Skin smooth. Teeth uniserial, those of the upper jaw with a posterior basal lobe; mandible with about 18 teeth on each side; canines moderately developed (the mesial being lost in the typical specimen). Snout somewhat produced, eye small. Tail longer than the body; the length of the head is two-fifths of that of the trunk. Brownish, with a network of large black meshes, about three or four in the height in the middle of the length of the fish; towards the head the meshes become smaller, whilst towards the end of the tail the meshes are replaced by transverse bars. Head finely mottled with brown and yellowish. Angle of the mouth black; fins with a narrow white edge.

Mauritius.

a. Type of the species: stuffed; 42 inches long. From Dr. Janvier's Collection.

42. **Muræna richardsoni.**

Muræna grisea, *Bleek. Verh. Bat. Gen.* xxii. *Bali*, p. 11.
—— richardsonii, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 296; or *Verh. Bat. Gen.* xxv. *Mur.* p. 45.
—— troschelii, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 45; or *Nat. Tyds. Ned. Ind.* vii. p. 101.
—— ceramensis, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 297; or *Verh. Bat. Gen.* xxv. *Mur.* p. 51.
—— scoliodon, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 43; or *Nat. Tyds. Ned. Ind.* vii. p. 100.
—— vermicularis, *Peters, Wiegm. Arch.* 1855, p. 271.
—— diplodon, *Peters, Wiegm. Arch.* 1855, p. 272.
—— floresiana, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 334.
—— venosa, *Kaup, Apod.* p. 68.
Thyrsoidea ceramensis, *Kaup, Apod.* p. 87.
—— multifasciata, *Kaup, l. c.*
Gymnothorax richardsonii, *Bleek, Atl. Ichth. Mur.* p. 100, pl. 42. fig. 2; *Kner, Novara, Fische*, p. 385.
—— scoliodon, *Bleek. l. c.* p. 101, pl. 40. fig. 2.
—— ceramensis, *Bleek. Ned. Tyds. Dierk.* i. p. 261; and *Atl. Ichth. Mur.* p. 101, pl. 33. fig. 3.
—— floresianus, *Bleek. Ned. Tyds. Dierk.* i. p. 252.
Muræna nubila (spec. from Houtman's Abrolhos), *Richards. Voy. Ereb. & Terr. Fish.* p. 81.

Skin distinctly folded, the folds crossing each other and forming scale-pouches. Teeth of old examples uniserial, without basal lobe; in younger examples the anterior mandibulary and maxillary teeth, and also sometimes the vomerine teeth, are biserial. Mandible with from ten to fourteen teeth on each side. Canines rather small; the mouth can be shut completely. The length of the anterior nasal tubes is rather less than the vertical diameter of the eye. Snout compressed, of moderate length. Eye of moderate size. Gill-opening as wide as the eye. Tail a little longer than the body. The length of the head is contained twice and one-third in that of the trunk. Gill-opening without black spot. Brownish, marbled with darker; on the back the dark colour forms an incomplete network of wide meshes, and the tail is crossed by dark cross bands. Young specimens without white edge to the anal fin, whilst a larger example (from Australia) has the white edge.

Indian Ocean and archipelago; Australia.

a, b, c. Many adult, half-grown, and young specimens. Zanzibar.

d. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—One of the typical examples of *M. ceramensis.*

e. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. richardsonii.*

f. Young. Amboyna. Purchased of Mr. Frank.

g. Young. Sumatra. From Dr. Bleeker's Collection.—Type of *M. scoliodon.*

h. Twenty-two inches long: stuffed. Houtman's Abrolhos. From Mr. Gilbert's Collection.

i. Half-grown.

43. Muræna tenebrosa.

Richards. Voy. Ereb. & Terr. Fish. p. 84 (copied by *Kaup, Apod.* p. 78).

Body much compressed; skin smooth. Teeth without basal lobe; the anterior teeth of the mandible subbiserial, the others uniserial; however, there are two larger teeth inside of the anterior maxillary teeth. *Canines large; the mouth cannot be shut completely.* Mandible with about twenty teeth on each side. Anterior nasal tubes short. Snout produced, pointed. Eye small. Cleft of the mouth wide. *Gill-opening narrower than the eye.* Tail somewhat longer than body. The length of the head is contained twice and three-fourths in that of the trunk. Dark purplish brown, with indistinct blackish, broad, numerous transverse bands and spots.

Polynesia.

a. Type of the species, 13½ inches long, bleached. Society Islands? Presented by the Royal College of Surgeons.

44. Muræna marmorea.

Muræophis marmoreus, *Valenc. in Voy. Vénus, Zool.* p. 347, pl. 10. fig. 1.

Muræna marmorea, *Kaup, Apod.* p. 66.

Teeth uniserial. "Yellowish brown, with black reticulations, whose longitudinal branching streaks are studded with oblong yellow spots. On the ventral aspect, the spots are larger, rounder, and near the throat coalescent. Dorsal fin yellowish brown, with black spots." (*Kaup.*)

Galapagos Islands.

45. Muræna flavomarginata.

? Muræophis grisea, *Lacép.* v. pp. 629, 642, 644.

? Muræna geometrica, *Rüpp. Atl.* p. 118, taf. 30. fig. 1.

Muræna flavomarginata, *Rüpp. Atl.* p. 119, taf. 30. fig. 3; *Günth. Fish. Zanz.* p. 127.

? Muræna bilineata, *Rüpp. N. W. Fisch.* p. 84.

Muræna pratbernon, *Richards. Voy. Ereb. & Terr. Fish.* p. 84.

—— batuensis, *Bleek. Nat. Tyds. Ned. Ind.* xii. p. 241.

—— javanica, *Bleek. l. c.* xix. p. 347.

? Thyrsoidea grisea, *Kaup, Apod.* p. 92, fig. 95.

Gymnothorax javanicus, *Bleek. Atl. Ichth. Muræn.* p. 95, pl. 35. fig. 2.
—— flavomarginatus, *Bleek. l. c.* pl. 32. fig. 2, and pl. 34. fig. 3.

Teeth uniserial, except the vomerine series, which is forked in front. Canines of moderate size, the mouth shutting completely. Mandible with from eighteen to twenty-two teeth on each side, the two anterior being canines. Anterior nasal tubes very short. Snout rather high, of moderate length. Eye small, one-half or two-fifths of the length of the snout, situated above the middle of the cleft of the mouth, which is two-fifths of the length of the head. Gill-opening wider than the eye. Tail as long as the body. The length of the head is contained thrice and one-third or thrice and four-fifths in that of the trunk. *Gill-opening in a black spot.* Body brown, densely marbled with black; head and end of the tail quite black. In a variety (*M. javanica*) the black spots are large, rounded, well-defined, forming about three longitudinal series. Sometimes two black depressed lines along the anal fin; fins frequently with a white edge.

Red Sea; Indian and Pacific Oceans.

a. Very large specimen. Port Natal. Purchased of Mr. Thomas Ayres.
b. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c, d. Half-grown. Zanzibar.
e. Large example. Seychelles. Presented by Prof. E. Perceval Wright.
f. Adult. Java. From Dr. Bleeker's Collection.—Type of *M. javanica.*
g, h. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—Types of *M. batuensis.*
i. Skin of a very large example, in spirits. Norfolk Island. Presented by J. B. Jukes, Esq.

46. **Muræna moringa.**

Catesby, Carol. ii. tab. 20 & 21.
Muræna, no. 5, *Klein, Pisc. Miss.* iii. p. 29; *Gronov. Zoophyl.* no. 165.
? Muræna brasiliensis, *Bl. Schn.* p. 529.
Muræna moringa, *Cuv. Règne Anim.*
—— moringua, *Richards. Voy. Ereb. & Terr. Fish.* p. 89 (cop. by *Kaup, Apod.* p. 79).
Gymnothorax rostratus, *Agass. in Spix, Pisc. Bras.* p. 91, tab. 50 *a.*
Murenophis rostrata, *Casteln. Anim. Am. Sud, Poiss.* p. 80, pl. 42. fig. 1.
—— curvilineata, *Casteln. l. c.* p. 81, pl. 42. fig. 2.
Muræna punctata, *Gronov. Syst.* ed. *Gray*, p. 18 (not *Bl. Schn.*).

Teeth uniserial; canines large, the jaws not shutting completely; mandible with from twenty-three to twenty-eight teeth on each side, of which the three anterior are canines, the third being separated from the preceding by an interspace. The length of the anterior nasal tubes is less than the vertical diameter of the eye. Snout produced, narrow. Eye of moderate size, two-fifths of the length of the snout, situated a little nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth very wide, two-fifths of the length of the head. Gill-opening a little wider than the eye. Tail as long as, or somewhat longer than, the body. The length of the head is one-half, or a little less than one-half, of that of the trunk. The entire fish with innumerable confluent, irregular, brownish-black spots separated by a fine network of the white ground-colour. Each pore of the lower jaw generally situated in a round white spot. Fins without white margin. In *young* examples the black spots are larger and less in number.

Vert. 65/79.

Tropical parts of the Atlantic.

a, *b*. Adult and half-grown. Bahia. From Dr. Wucherer's Collection.
c. Half-grown. Cuba. Purchased of Mr. Scrivener.
d. Adult: stuffed. West Indies. From the Haslar Collection.
e. Several skins. Jamaica.
f. Half-grown. Jamaica.
g. Half-grown. Dominica. Purchased of Mr. Cutter.
h, *i*. Adult. St. Croix. Purchased of Mr. Stevens.
k. Adult. Island of Bonacca. Collected by Mr. Macgillivray.
l, *m*. Adult and half-grown. St. Helena. Presented by J. C. Melliss, Esq.
n, *o*. Adult and half-grown. From the Collection of Dr. van Lidth de Jeude.
p. Adult: skeleton. From the Collection of Dr. van Lidth de Jeude.

47. Muræna vicina.

Murenophis vicina, *Casteln. An. Amér. Sud, Poiss.* p. 81, pl. 42. fig. 4.
—— caramuru, *Casteln. l. c.* p. 82, pl. 43. fig. 1.

Teeth uniserial, sometimes an additional tooth or two forming an inner maxillary series; mandibulary teeth about nineteen on each side; canines strong, but the mouth can be shut completely. Gill-openings narrower than the eye. Snout produced, twice as long as the eye, which is large. Cleft of the mouth wide, its length being contained twice and one-fourth in that of the head. Tail longer than the body. The length of the head is contained from once and three-fourths to twice and one-half in that of the trunk. Olive-coloured, densely and rather finely marbled with brown, the brown coloration being by far the more prominent, and nearly entirely suppressing the ground-colour, which appears in irregular vermiculated lines or small spots. Angle of the mouth brown; fins with a distinct white margin; gill-opening without brown spot.

Bahia.

a, *b*. Adult. Bahia. From Dr. Wucherer's Collection.

f. *Snout with brown longitudinal bands.*

48. Muræna callorhyncha.

Maxillary teeth and the anterior of the mandible biserial; the others uniserial. Canines short. Mandible with about twenty closely set teeth in the outer series on each side. Snout of moderate length, obtuse, nearly thrice as long as the eye, which is small. Gill-opening still narrower than the eye. The length of the cleft of the mouth is contained twice and one-third in that of the head. Fins very low, the dorsal commencing behind the gill-opening. Tail a little longer than the body. The length of the head is contained thrice and three-fourths in that of the trunk. Nearly uniform greyish olive (in spirits); snout white, with a brown band on each side, running from above the orbit over the front nostril to the edge of the upper lip.

Freemantle, Australia.

a. Nineteen inches long.

g. *Coloration uniform.*

a. *Dorsal fin elevated.*

49. Muræna hepatica.

Muræna hepatica, *Rüpp. Atl. Fisch.* p. 120.
—— albomarginata, *Schleg. Faun. Japon. Poiss.* p. 267, pl. 118; *Bleek. Nat. Tyds. Ned. Ind.* xiii. p. 77.
Gymnothorax albimarginatus, *Bleek. Atl. Ichth. Mur.* p. 107, pl. 37. fig. 2, and pl. 40. fig. 3.

Dorsal fin elevated, the posterior rays being as high as, or higher than, the body underneath, *commencing in advance of the gill-opening.* Teeth uniserial, canines scarcely enlarged; the mouth can be shut completely. Length of the anterior nasal tubes less than the vertical diameter of the eye. Snout rather thick, of moderate length. Eye rather small, two-fifths of the length of the snout, nearer to the angle of the mouth than to the end of the snout. Gill-opening scarcely wider than the eye. *Tail as long as, or shorter than, the body.* The length of the head is contained thrice and two-thirds in that of the trunk. *Uniform brown, fins with a white margin.*

Red Sea; East-Indian archipelago; Japan.

a. Adult. Amboyna. From Dr. Bleeker's Collection.—Type of *M. albomarginata.*

50. Muræna euptera.

Dorsal fin rather elevated, the posterior rays being nearly as high as the body underneath, *commencing far in advance of the gill-opening.* Teeth uniserial, canines scarcely enlarged; mandible with about sixteen conical acute teeth on each side; the mouth can be shut completely. Length of the anterior nasal tubes a little less than the vertical diameter of the eye. Snout somewhat produced, at least twice as long as the diameter of the eye, which is large and wider than the gill-opening. Cleft of the mouth two-fifths of the length of the head. *Tail longer than the body.* The length of the head is two-fifths of that of the trunk. Skin with very distinct scale-pouches. Uniform brown, fins with a white margin; gular folds and angle of the mouth dark brown.

Raoul Island.

a. Twenty-four inches long. Collected by Mr. Macgillivray.

51. Muræna cinerascens.

Rüppell, Atl. Fisch. p. 120.

Dorsal fin rather elevated, *commencing above the gill-opening.* Teeth? Tail rather longer than the body. Uniform greyish; fins with a narrow light edge. Black longitudinal lines from the mouth towards the gill-opening. (*Rüpp.*)

Red Sea.

β. Dorsal fin not elevated.

52. Muræna afra.

Gymnothorax afer, *Bl. Ausl. Fisch.* ix. p. 85, tab. 417; *Bl. Schn.* p. 526.
Muræenophis afra, *Lacép.* v. p. 642.
Gymnothorax funebris, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* iv. 1840, p. 76.
Muræna lineopinnis, *Richards. Voy. Ereb. & Terr. Fish.* p. 89.
—— prasina, *Richards. l. c.* p. 93.
—— boschii, *Bleek. Verh. Bat. Gen.* xxv. *Mur.* p. 52; or *Nat. Tyds. Ned. Ind.* vii. p. 103.
—— monochrous, *Bleek. Nat. Tyds. Ned. Ind.* x. p. 384.
—— tristis, *Kaup, Apod.* p. 62.
Thyrsoidea lineopinnis, *Kaup, Apod.* p. 82.
Muræna infernalis, *Poey, Mem. Cub.* ii. pp. 347, 354.
Tæniophis westphali, *Kaup, Aale Hamburg. Mus. Nachtrag,* p. 1.
Gymnothorax boschi, *Bleek. Atl. Ichth. Mur.* p. 105, pl. 46. fig. 3.
—— monochrous, *Bleek. l. c.* p. 106, pl. 47. fig. 2.
—— jacksoniensis, *Bleek. Versl. en Meded. Ak. Wet. Amsterd.* xv. 1863, p. 450.
—— infernalis, *Poey, Repert. Fis.-nat. Cuba,* ii. p. 258.

Teeth uniserial in old examples, except the vomerine teeth, which are sometimes biserial. Young examples generally with the anterior mandibulary and maxillary teeth biserial. Mandible with about twenty teeth on each side, the four anterior of which are much longer than the others, and, like the canines, rather elongate. Anterior nasal tubes half as long as the eye. *Gill-opening nearly as wide as the eye.* Snout narrow, produced, pointed. Eye of moderate size, half the length of the snout, situated somewhat nearer to the angle of the cleft of the mouth than to the end of the snout. Cleft of the mouth wide, two-fifths of the length of the head. Tail longer than the body. The length of the head is contained twice and one-third or twice and two-thirds in that of the trunk. *Brownish black: fins without light edge.*

Tropical parts of the Atlantic; Indian Ocean; Australia.

a. Type of *M. tristis,* 15 inches long. River Niger. Collected by Mr. Fraser.

b. Type of *M. lineopinnis,* 22 inches long. Puerto Caballo. Purchased of Mr. Brandt.

c–g. Adult and young: skins. Jamaica. Purchased of Mr. Parnell.

h. Half-grown. Island of Grenada. Purchased of Mr. Cutter.

i. Type of *M. monochrous.* East-Indian archipelago. From Dr. Bleeker's Collection.

k. Type of *M. boschii,* young. Sumatra. From Dr. Bleeker's Collection.

l, m. Adult and half-grown. Port Essington. From the Haslar Collection.

n. Large specimen. Sydney. Presented by G. Krefft, Esq.

o. Half-grown: stuffed. Australia.—Type of *M. prasina.*

p. Adult. From the Collection of Dr. van Lidth de Jeude.

53. Muræna aterrima.

Thyrsoidea aterrima, *Kaup, Aale Hamburg. Mus.* p. 22.
Tæniophis aterrima, *Kaup, l. c.* tab. 3. fig. 1.
? Gymnothorax aterrimus, *Bleek. Ned. Tyds. Dierk.* ii. p. 244.

Closely allied to *M. afra,* but with a smaller eye.

Teeth uniserial, except those on the vomer, which are more or less distinctly biserial; in young examples two or three inner maxillary teeth. Canines rather small. Gill-opening rather wider than the *eye, which is small,* less than one-half of the length of the snout. Snout of moderate length; cleft of the mouth moderately wide, its length being contained twice and three-fourths in that of the head. Tail rather longer than the body; the length of the head is contained twice and one-third in that of the trunk. Entirely uniform black.

West Indies; Atlantic coast of Central America.

a. Half-grown. Dominica. Purchased.

54. Muræna maculipinnis.

Thyrsoidea maculipinnis, *Kaup, Apod.* p. 83; *Duméril, Arch. Mus.* x. p. 260, pl. 28. fig. 1; *Bleek. Verh. Holl. Maatsch. Haarlem,* 1862, *Guinée,* p. 129, tab. 27 (coloration after a specimen preserved in spirits); *Troschel, Wiegm. Arch.* 1866, p. 237.
—— cormura, *Kaup, Aale Hamburg. Mus.* p. 23.
Tæniophis cormura, *Kaup, l. c.* tab. 3. fig. 2.
Thyrsoidea marginata, *Kaup, l. c.* p. 24.
Tæniophis marginata, *Kaup, l. c.* tab. 4. fig. 1.
? Gymnothorax funebris, *Bleek. Ned. Tyds. Dierk.* ii. p. 245.

Teeth uniserial, sometimes an additional inner maxillary tooth; mandible with about 22 teeth on each side; canines well developed, but the jaws can be shut nearly completely. *Gill-opening narrower than the eye.* Snout narrow, produced, pointed; twice as long as the eye, which is large. Cleft of the mouth wide, contained twice or twice and one-third in the length of the head. The length of the head is one-half of that of the trunk. *Uniform blackish-brown; dorsal with a black, anal with a narrow white edge.*

Tropical parts of the Atlantic.

a, *b*. Fine specimens. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

c. Adult: stuffed. Fernando Po.

d. Adult. Mexico.

55. **Muræna unicolor.**

Murænophis unicolor, *De la Roche, Ann. Mus.* xiii. 1809, p. 359, fig. 15.

Muræna cristini, *Risso, Ichth. Nice*, p. 368, or *Eur. Mérid.* iii. p. 191.

—— monaca, *Cocco.*

—— unicolor, *Lowe, Trans. Zool. Soc.* ii. p. 192; *Costa, Faun. Nap. Pesc.*

?Thyrsoidea microdon, *Kaup, Apod.* p. 89, fig. 64.

Thyrsoidea unicolor, *Kaup, Apod.* p. 91.

Teeth in front of the jaws, on the maxillary and, generally, on the vomer biserial; the lateral teeth of the mandible uniserial. Canines small, scarcely larger than the others. Anterior nasal tubes extremely short. Gill-openings a little larger than the eye, which is very small. Snout short, obtuse, thrice as long as the eye, which is somewhat nearer to the angle of the mouth than to the end of the snout. Cleft of the mouth of moderate width. Tail a little longer than the body; the length of the head is contained twice and one-half or twice and two-thirds in that of the trunk. Nearly uniform brown or brownish black; the head is darker than an obscure lighter cross band behind the angle of the mouth, which is black. Sometimes the body or the anterior portion of it with an indistinct network of short black lines crossing each other. Fins with a light edge.

Vert. 65/71.

Mediterranean; Madeira; St. Helena; (Madagascar?).

a. Half-grown. Algiers. Presented by Lieut.-Col. Playfair.

b, *c*. Half-grown. Madeira. Presented by J. Y. Johnson, Esq.

d, *e–f*. Adult and half-grown. St. Helena. Presented by J. C. Melliss, Esq.

g. Adult. From the Collection of Dr. van Lidth de Jeude.

h. Adult: skeleton. Madeira. From the Collection of the Zoological Society.

56. **Muræna maderensis.**

Pseudomuræna madeirensis, *Johnson, Proc. Zool. Soc.* 1860, p. 167.

Most closely allied to *M. unicolor*, from which it apparently differs in the dentition. Known from two very old examples only *.

Teeth uniserial, not numerous, *slightly serrated behind*; anterior teeth scarcely larger than the others; vomer toothless. Gill-opening scarcely larger than the eye, which is very small. Snout obtuse; cleft of the mouth of moderate width. Tail shorter than the body; the length of the head is two-sevenths of that of the trunk. Uniform blackish brown; anterior part of the body with short, black undulating lines.

---

* I have also to remark that a smaller example, 21 inches long, given by Mr. Johnson to the Liverpool Museum as *Pseudomuræna madeirensis*, is nothing but *Muræna unicolor.*

Madeira.

a. Type of the species, 41 inches long. Presented by J. Y. Johnson, Esq.

57. **Muræna sanguinea.**

Pythonichthys sanguineus, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 265, pl. 2. fig. 7 (head).

Teeth small, pointed, biserial in the jaws, pluriserial on the vomer. Tail longer than the body; the length of the head is one-half of the distance of the gill-opening from the vent. Mouth wide. Eye very small. Nostrils not tubular. Uniform pink. (*Poey.*)

Cuba.

58. **Muræna moluccensis.**

Priodonophis moluccensis, *Bleek. Ned. Tyds. Dierk.* ii. p. 48; or *Atl. Ichth. Mur.* p. 108, pl. 43. fig. 1.

Teeth uniserial, *with the hinder edge serrated*; vomerine teeth subbiserial anteriorly; mandible with about 22 teeth on each side. Canines small. Gill-opening wider than the eye. Snout depressed, obtusely rounded in front, of moderate length. Eye rather small, half as long as the snout. Tail shorter than the body; the length of the head is one-third of that of the trunk. Skin with scale-pouches. Uniform brown.

Amboyna.

a. Type of the species, 399 millims. long. From Dr. Bleeker's Collection.

59. **Muræna modesta.**

Kaup, Aale Hamburg. Mus. p. 21, tab. 4. fig. 2.

Teeth uniserial, *with a basal lobe*; mandible with twelve teeth on each side; snout short, obtuse; eye small, two-thirds of the length of the snout. Tail rather shorter than body. Brown, with irregular blackish venules. (*Kaup.*)

Valparaiso.

60. **Muræna sathete.**

Murænophis sathete, *Ham. Buch. Fish. Gang.* pp. 17, 363.

Lycodontis longicaudata, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 187, pl. 8. fig. 2.

Strophidon longicaudata, *M'Clell. l. c.* p. 215.

Muræna sathete, *Richards. Voy. Ereb. & Terr. Ichth.* p. 91; *Cant. Mal. Fish.* p. 331.

Thyrsoidea sathete, *Kaup, Apod.* p. 86 (cop. from *Richards.*).

Maxillary, vomerine, and anterior mandibulary teeth biserial, the others uniserial. Canines but little larger than the others. Snout of moderate length; eye small. Cleft of the mouth of moderate width. Tail rather longer than the body; *the length of the head is about two-sevenths of that of the trunk.* Upper parts dark coloured, the lower lighter.

Bay of Bengal; Pinang.

a. Thirty-two and a half inches long: stuffed.

2. *Snout slender, much elongate.*

61. **Muræna schismatorhynchus.**

Muræna schismatorhynchus, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 301; or *Verh. Bat. Gen.* xxv. *Mur.* p. 71.
—— congeroides, *Bleek. Act. Soc. Sc. Ind.-Neerl.* viii. *Sumatra,* viii. p. 87.
Eurymyctera crudelis, *Kaup, Apod.* p. 72, tab. 11. fig. 56 (head, bad).
Gymnothorax crudelis, *Bleek. Ned. Tyds. Dierk.* i. p. 168.
—— schismatorhynchus, *Bleek. Atl. Ichth. Mur.* p. 106, pl. 40. fig. 1.

Snout narrow, much elongate, more than twice the diameter of the eye, which is large. *Cleft of the mouth very wide,* half as long as the head. Teeth uniserial in adult examples; *mandible with about* 36 *teeth on each side*; canines large; the mouth cannot be shut completely. Gill-opening at least as wide as the eye. Tail rather shorter than the body; the length of the head is contained twice and one-third in that of the trunk. Uniform brown; fins with a white margin.

East-Indian archipelago.

a. Type of *M. schismatorhynchus.* Sumatra. From Dr. Bleeker's Collection.
b. Type of *M. congeroides.* Sumatra. From Dr. Bleeker's Collection.

62. **Muræna acutirostris.**

Abbott, Proc. Ac. Nat. Sc. Philad. 1860, p. 476.

Head much compressed; *jaws greatly attenuated, very slender.* Teeth uniserial, compressed and very acute; canines long; the anterior tooth of the vomerine series much larger than the succeeding; mandible with 26 teeth on each side. Eye large. Dark brown, irregularly reticulated with narrow bands of white. Tail longer than the body; the length of the head is contained twice and one-third in that of the trunk. (*Abbott.*)

Sandwich Islands.

3. *Exceedingly elongate, the tail being twice as long as the body.*

63. **Muræna macrurus.**

Muræna macrurus, *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 324.
Thyrsoidea longissima, *Kaup, Apod.* p. 82.
—— macrurus, *Bleek. Atl. Ichth. Mur.* p. 111, pl. 22. fig. 2; *Kner, Novara, Fisch.* p. 386.

Exceedingly elongate, the tail being twice as long as the body. The length of the head is about one-tenth or one-twelfth of the total, and one-third of that of the trunk. Maxillary and mandibulary teeth biserial; canines but little developed. Eye of moderate size, at least one-half of the length of the snout, and much nearer to the end of the snout than to the angle of the mouth. Snout rather obtuse; cleft of the mouth very wide, one-third of the length of the head. Gill-opening rather wider than the eye. Uniform blackish brown.

Indian Ocean and archipelago.

a. Forty-six inches long. Port Natal. From Mr. Ayres's Collection.
b. Skin, ten feet long. Ceylon. Presented by — Nimmo, Esq.
c. Large specimen: stuffed. Indian Ocean. Presented by T. C. Jerdon, Esq.
d. Large specimen. Java. From Dr. Bleeker's Collection.—Type of the species.
e. Skin, in spirits, 9 feet long. Presented by Sir A. Smith.

4. *Exceedingly elongate, the tail being nearly as long as the body.*

64. **Muræna brummeri.**

Muræna brummeri, *Bleek. Nat. Tyds. Ned. Ind.* xvii. p. 137.
Strophidon brummeri, *Bleek. Atl. Ichth. Mur.* p. 109.
Pseudechidna brummeri, *Bleek. l. c.* pl. 18. fig. 1.

Body and tail very slender, the length of the head being one-sixth of that of the trunk; tail a little longer than the body. Teeth uniserial. Dorsal fin rather elevated, more than half as high as the body. Uniform brownish olive, head with brown dots, fins with a white margin.

Timor, Ceram.

a. Type of the species. Timor. From Dr. Bleeker's Collection.

65. **Muræna polyodon.**

Strophidon polyodon, *Bleek. Ned. Tyds. Dierk.* ii. p. 47; or *Atl. Ichth. Mur.* p. 109, pl. 19. fig. 3.

Body and tail very slender, the length of the head being one-sixth of that of the trunk; tail longer than the body. Maxillary and anterior mandibulary teeth biserial. Dorsal fin moderately developed, not half as high as the body. Uniform brownish olive, head with brown dots, fins with a white margin.

Amboyna.

a. Type of the species. From Dr. Bleeker's Collection.

II. *Most of the teeth are obtuse, molar-like*: Pœcilophis.

66. **Muræna zebra.**

? *Seba*, ii. p. 72, tab. 70. fig. 1; ii. p. 73, tab. 70. fig. 3.
Gymnomuræna zebra, *Shaw, Zool. Misc.* p. 101; *Richards. Voy. Ereb. & Terr. Fish.* p. 95 (copied by *Kaup, Apod.* p. 104, fig. 70).

Gymnothorax zebra, *Bl. Schn.* p. 528.
Gymnomuræna doliata, *Lacép.* v. pp. 648, 649, pl. 19. fig. 4.
Muræna molendinaris, *Bennett, Proc. Zool. Soc.* i. 1833, p. 32.
Muræna zebra, *Bleek. Nat. Tyds. Ned. Ind.* xiii. p. 80; and *Act. Soc. Sc. Indo-Neerl.* ii. *Amboyna*, viii. p. 93.
Gymnomuræna fasciata, *Kaup, Apod.* p. 103, fig. 69 *.
Echidna zebra, *Bleek. Atl. Ichthyol. Mur.* p. 81, pl. 27. fig. 1.

Jaws armed with plates or bands of obtuse molars. Tail only half as long as the trunk. Fins hidden below the skin. Blackish brown, surrounded by very numerous (30–100) narrow, white, dark-edged rings. The rings are the less regular and complete the more numerous they are.

Vert. 97/38.

Indian archipelago; Pacific.

a. Type of the species, 29 inches long. Sumatra. Presented by the Royal College of Surgeons.
b. Half-grown. Sumatra. From the Collection of Sir T. S. Raffles.
c. Young, 14 inches long. Amboyna. Purchased of Hr. Frank.
d. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
e. Adult. Samoa Islands. From the Collection of Messrs. Godeffroy.
f. Type of *M. molendinaris*, Benn., and *G. fasciata*, Kaup, 50 inches long. Mauritius. From the Collection of the Zoological Society.
g. Adult: skeleton. Seychelle Islands. Presented by Professor E. Perceval Wright (var. *molendinaris*).

67. Muræna polyzona.

Muræna polyzona, *Richards. Voy. Sulph. Zool.* p. 112, pl. 55. figs. 11–14, and *Voy. Ereb. & Terr. Fish.* p. 95; *Bleek. Act. Soc. Sc. Indo-Neerl. Manado*, p. 73.
—— dizona, *Bleek. Nat. Tyds. Ned. Ind.* xxii. p. 260.
Pœcilophis polyzonus, *Kaup, Apod.* p. 101 (copied from *Richardson*); *Kner, Novara, Fische*, p. 382.
Echidna polyzona, *Bleek. Atl. Ichth. Mur.* p. 81, pl. 24. fig. 3.

Jaws armed with bands of obtuse molars; maxillary teeth obtusely conical. Tail as long as the body. Fins distinct. Blackish brown, surrounded by rather numerous (26–29) narrow whitish rings, widening on the abdomen.

East-Indian archipelago.

a. Type of the species, 9½ inches long. Presented by Sir J. Richardson.
b. Ten inches long. From the Haslar Collection.
c, *d*. Nine inches long.

---

* Hr. Kaup's acquaintance with the literature of the Apodal Fishes was very limited. In this instance he actually proposes a new name for the identical specimen which was the type of Bennett's *M. molendinaris*.

e. Ten and a half inches long. East-Indian archipelago. From Dr. Bleeker's Collection.

f. Two and a half inches long. Timor-Kupang. From Dr. Bleeker's Collection. Type of *M. dizona*.

68. Muræna nebulosa.

Seba, ii. tab. 69. figs. 1, 17.
Muræna nebulosa, *Ahl, De Mur. et Ophichth.* p. 5, tab. 1. fig. 2.
Gymnothorax nebulosus, *Bl. Schn.* p. 528.
—— echidna, *Bl. Schn.* p. 526.
Echidna variegata, *Forst. Descr. An.* ed. *Licht.* p. 181; *Bleek. Atl. Ichth. Mur.* p. 80, tab. 24. fig. 2.
Muræna ophis, *Rüpp. Atlas, Fische*, p. 116, taf. 29. fig. 2; *Richards. Voy. Ereb. & Terr. Fish.* p. 93.
Thærodontis ophis, *M'Clell. Calc. Journ. Nat. Hist.* v. p. 217.
Muræna variegata, *Richards. Voy. Ereb. & Terr. Fish.* p. 94, pl. 47. figs. 11–16; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 295; or *Verh. Bat. Gen.* xxv. *Mur.* p. 47; *Peters, Wiegm. Arch.* 1855, p. 270.
Pœcilophis variegata, *Kaup, Apod.* p. 98, tab. 13. fig. 67; *Kner, Novara, Fisch.* p. 381.

Teeth obtuse, molar-like. Yellowish, with fine vermiculated black lines, and two series of large black spots, the upper running along the side of the back, the lower along the lower half of the body; each spot includes one or more white spots; more or less regular black bands across the abdomen connecting the spots of the lower series. The black spots are sometimes reduced to star-like figures.

Vert. 65/57.

Indian and Pacific Oceans.

a. Adult. Port Natal. Purchased of Mr. Th. Ayres.
b–d. Adult, half-grown, and young. Zanzibar. From Dr. Kirk's Collection.
e. Adult, in bad state. Madagascar. Presented by Dr. J. E. Gray.
f. Adult. Seychelles. Presented by Lieut.-Col. Playfair.
g. Adult. India. Presented by General Hardwicke.
h, i, k. Adult and half-grown. Moluccas.
l–m. Adult. Amboyna. Purchased of Mr. Frank.
n. Adult. Macassar. Presented by Mr. Barclay.
o. Adult. Siam. Purchased of Mr. Jamrach.
p. Young. China Seas. Presented by Vice-Admiral Sir E. Belcher.
q, r–s. Half-grown and young. Feejee Islands.
t. Adult. Trinity Bay. Presented by Mrs. Stanley.
u. Half-grown. New Holland.
v, w, x–y. Adult and half-grown.
z. Adult: skeleton. From Mr. Stokes's Collection.

69. Muræna catenata.

Seba, ii. p. 72, tab. 69. figs. 4 & 5; *Houtt. Nat. Hist.* i. 7. p. 85, tab. 57. fig. 2.

Gymnothorax catenatus, *Bl. Ausl. Fisch.* xii. p. 84, taf. 415. fig. 1; *Bl. Schn.* p. 528.
Murenophis catenula, *Lacép.* v. pp. 628, 641.
Muræna sordida, *Cuv. Règne Anim.*
Muræna catenata, *Richards. Voy. Ereb. & Terr. Fish.* p. 95.
Pœcilophis catenatus, *Kaup, Apod.* p. 100 (cop. *Richards.*).
Muræna alusis, *Bleek. Act. Soc. Sc. Ind.-Neerl. Amboyna*, p. 67.
Echidna catenata, *Bleek. Ned. Tyds. Dierk.* ii. p. 242.
—— fuscomaculata, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 263.
—— flavofasciata, *Poey, l. c.* p. 264.

Teeth obtuse, molar-like; those of the maxillary in a double series, conical and pointed. Yellowish, with large black spots; the spots are generally so large that the ground-colour appears merely as a network of more or less narrow whitish lines.

Vert. 65/51.

Atlantic coasts of Tropical America.

a, b. Adult and half-grown. Surinam. From the Collection of Dr. van Lidth de Jeude.
c. Adult. Puerto Cabello. Purchased of Hr. Brandt.
d. Adult. Trinidad. Presented by J. B. Jukes, Esq.
e–f. Adult. Dominica. Purchased of Mr. Cutter.
g. Adult. St. Croix. Purchased.
h–i. Adult and half-grown. Barbadoes. Purchased of Mr. Cutter.
k. Adult. Old Collection.
l. Adult: stuffed.
m. Young. Presented by Sir A. Smith.
n. Adult: skeleton. Barbadoes. Purchased of Mr. Cutter.

70. **Muræna xanthospila.**

Muræna xanthospilos, *Bleek. Nat. Tyds. Ned. Ind.* xix. p. 348.
Pœcilophis ornata, *Kaup, Aale Hamburg. Mus.* p. 28, tab. 5.
Echidna xanthospilus, *Bleek. Atl. Ichth. Mur.* p. 79, pl. 23. fig. 1.

Teeth obtuse, molar-like; maxillary teeth in a single series. Tail shorter than the body. The dorsal fin begins in advance of the gill-opening. Brown, with white or yellow ocelli, which are much larger than the eye, and largest and of irregular form on the abdomen.

East-Indian archipelago.

a. Type of the species. Java. From Dr. Bleeker's Collection.

71. **Muræna lecomtii.**

Pœcilophis lecomtei, *Kaup, Apod.* p. 103; *Duméril, Arch. Mus.* x. pl. 23. fig. 2.

Teeth obtuse, molar-like; maxillary teeth biserial, those of the inner series more pointed. Tail a little shorter than the body. The dorsal begins behind the gill-opening. Dark brown, with white ocelli, about as large as the eye, and arranged in transverse series.

Gaboon.

72. Muræna pelii.

Pœcilophis peli, *Kaup, Apod.* p. 102, fig. 68; *Bleek. Verh. Holl. Maatsch. Haarlem,* 1862, *Guinée,* p. 130, tab. 28.

Teeth obtuse, those of the maxillary biserial, more pointed. Tail rather shorter than the body. Blackish, with innumerable yellowish brown freckles on the dorsal fin and along the back. A black, interrupted longitudinal stripe on the dorsal, together with rows of yellowish points. Pores on the snout placed in white disks. (*Kaup.*)

Gold Coast.

73. Muræna fascigula.

Peters, Wiegm. Arch. 1855, p. 271.

Teeth obtuse, those of the maxillary uniserial. Tail longer than the body. Dorsal fin beginning in advance of the gill-opening. Brown, with a dark spot at the angle of the mouth, dark brown lines along the side of the throat, and a few narrow white rings on the extremity of the tail. (*Ptrs.*)

Mozambique.

74. Muræna amblyodon.

Muræna amblyodon, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado,* p. 72.
Pœcilophis delicatulus, *Kaup, Apod.* p. 102.
Echidna amblyodon, *Bleek. Atl. Ichth. Mur.* p. 79, tab. 22. fig. 1.
—— delicatula, *Bleek. l. c.* p. 78, tab. 23. fig. 3.

Teeth obtuse, molar-like; those of the inner maxillary series more pointed. The dorsal fin begins in advance of the gill-opening. Nearly uniform brown, with some darker specks.

East-Indian archipelago.

a. Type of *M. amblyodon*, 8 inches long. Manado. From Dr. Bleeker's Collection.
b. Seven inches long. From Dr. Bleeker's Collection, as *M. delicatula*.

75. Muræna rhodochilus.

Echidna rhodochilus, *Bleek. Ned. Tyds. Dierk.* i. p. 246; or *Atl. Ichth. Mur.* p. 79, pl. 23. fig. 4.

Teeth obtuse, molar-like, those of the maxillaries pointed. The dorsal fin begins behind the gill-opening. Brown, finely marbled with darker; lips with an elongate white spot.

Booro; Rotti.

a. Type of the species, 12 inches long. From Dr. Bleeker's Collection.

---

76. Muræna auloptera.

De Filippi, Rev. et Mag. Zool. 1853, p. 168.

This species is described as having a prominent fold of the skin at the gill-opening—that is, a rudimentary pectoral fin. Whitish; the pores on the snout brown.

Mauritius.

The typical specimen is in the Turin Museum.

25. GYMNOMURÆNA.

Gymnomuræna, sp., et Muræenoblenna, *Lacép.* v. p. 648.
Ichthyophis, *Lesson, Voy. Coq. Zool.* ii. p. 129.
Uropterygius, *Rüpp. N. W. Fische*, p. 83.
Gymnomuræna, *Bleek. Atl. Ichth. Mur.* p. 112.
Channomuræna, *Richards. Voy. Ereb. & Terr. Fish.* p. 96.

Scalelsss. Teeth numerous, small, pointed. Gill-openings narrow. Fins none except a rudimentary one round the end of the tail. Two pairs of nostrils on the upper surface of the snout, the posterior being a small round foramen.

Tropical parts of the Indian and Pacific Oceans; ? Atlantic.

a. *Gape of moderate width; snout of moderate length*: Gymnomuræna.

1. Gymnomuræna tigrina.

Ichthyophis tigrinus, *Lesson, Mém. Soc. d'Hist. Nat. Paris*, iv. p. 399, and *Voy. Coq. Zool.* ii. p. 129, *Atl. Poiss.* pl. 12; *Richards. Voy. Ereb. & Terr. Fish.* p. 96; *Bleek. Versl. Ak. Wet. Natuurk.* xv. p. 463.
Muræenoblenna tigrina*, *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboyna*, viii. p. 93.
Gymnomuræna tigrina, *Bleek. Atl. Ichth. Mur.* p. 113, pl. 21. fig. 3; *Kner, Novara, Fisch.* p. 387.
Skull: *Owen, Osteol. Catal.* i. p. 14.

Brownish, with larger and smaller well-defined round black spots. Maxillary and anterior mandibulary teeth in a double series; no distinct canine teeth. Eye small; posterior nostril in a short tube.

Indian Ocean and archipelago; Western Pacific.

a.	Four feet long: stuffed.	Mauritius.
b.	Adult.	Zanzibar. Presented by Lieut.-Col. Playfair.
c.	Adult.	East-Indian archipelago. From Dr. Bleeker's Collection.
d.	Adult.	India. Presented by General Hardwicke.

2. Gymnomuræna marmorata.

Gymnomuræna marmorata, *Lacép.* v. pp. 648, 650; *Bleek. Atl. Ichth. Mur.* p. 113, pl. 31. fig. 3.
Ichthyophis pantherinus, *Less. Voy. Coq. Poiss.* ii. p. 131, *Atl.* pl. 13; *Bleek. Versl. Ak. Wet. Natuurk.* xv. p. 464.
Muræna micropterus, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 298; or *Verh. Bat. Gen.* xxv. *Mur.* p. 50 (young).
Uropterygius xanthopterus, *Bleek. Nat. Tyds. Ned. Ind.* xix. p. 350 (young).
Gymnomuræna macrocephalus, *Bleek. Ned. Tyds. Dierk.* ii. p. 54; or *Atl. Ichth. Mur.* p. 114, pl. 21. fig. 2 (young).

---

* Bleeker has shown that Kaup has confounded very different fishes under this name.

Gymnomuræna xanthopterus, *Bleek. l. c.* pl. 20. fig. 4; *Kner, Novara, Fische*, p. 388.
—— micropterus, *Bleek. l. c.* p. 115, pl. 20. fig. 2; *Kner, l. c.*

Brownish or brownish grey, finely marbled with darker. Teeth of the jaws in narrow bands, cardiform, those between the maxillary bands being somewhat the largest. Eye small; posterior nostrils with a raised border (more conspicuous in old than in young examples).

East-Indian archipelago; Island of Oualan.

a. Adult. Old Collection.
b. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
c. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. microptera*.
d. Young. Amboyna. From Dr. Bleeker's Collection.—Type of *G. macrocephalus*.
e. Young. Borneo.

3. Gymnomuræna concolor.

? Murænoblenna olivacea, *Lacép.* v. p. 652.
Uropterygius concolor, *Rüpp. N. W. Fische*, p. 83, taf. 20. fig. 4.

Uniform brown. Maxillary and mandibulary teeth in a double series; no distinct canine teeth. Eye of moderate size; posterior nostrils not tubular. (Tail but little longer than the body.)

Red Sea; Cape York (Australia); ? Straits of Magellan.

a. Twenty inches long. Cape York. From Hr. Dämel's Collection.

This example agrees so well with Rüppell's description that I cannot hesitate to identify it with the Red-Sea species. Rüppell states that there is only one tooth on the "palate," whilst our example has the usual series of vomerine teeth. It is well known that no value is to be attached to such individual discrepancies.

4. Gymnomuræna fusca.

Peters, Monatsber. Ak. Wiss. Berlin, 1866, p. 524.

Uniform brown. Teeth of the jaws biserial (those of the inner series much shorter than those of the outer series*). Tail one-half longer than the body. Posterior nostrils not tubular. (*Ptrs.*)

Amboyna.

β. *Gape very wide; snout very short*: Channomuræna.

5. Gymnomuræna vittata.

Parra, p. 66, lam. 30. fig. 3.
Ichthyophis vittatus, *Richards. Voy. Sulph. Fish.* p. 114, pl. 53. figs. 7–9.
Nettastoma (Channomuræna) vittata, *Richards. Voy. Ereb. & Terr. Fish.* p. 96; *Kaup, Apod.* p. 97.

---

* This, if correct, would be a very singular character, inasmuch as the teeth of the inner series in all the true Murænoids are the longer, at least in the upper jaw.

Channomuræna cubensis, *Poey, Repert. Fis.-nat. Cuba*, ii. p. 266, lam. 3. fig. 6 (head).

Teeth equal in size, forming bands. Cleft of the mouth half as long as the head. Tail half as long as and much lower than the trunk. Yellowish, with irregular broad brown cross bands.
West Indies.

a. Type of the species, stuffed, 48½ inches long. From the Haslar Collection.

b. Twenty-eight inches long. Cuba. Purchased of Mr. Scrivener.

6. Gymnomuræna bennettii.

Teeth equal in size, forming broad bands, the upper band consisting of about six, and the lower of about four series. Vomerine band short. Snout very short; eye very small, about two-fifths of the length of the snout. Cleft of the mouth exceedingly wide, half as long as the head. Tail half as long as and much lower than the body. The length of the head is two-sevenths of that of the trunk. Uniform brown (in a dried state).
Mauritius.

a. Stuffed, 37 inches long. From Mr. Telfair's Collection. Presented by the Zoological Society.

I have dedicated this species to the memory of Mr. Bennett, who, as Secretary of the Zoological Society, more than thirty years ago described the fishes of the Mauritius in an admirable manner.

26. ENCHELYCORE.

Enchelycore, *Kaup, Apod.* p. 73.

Scaleless. Teeth numerous, acutely pointed, unequal in size. Gill-openings narrow. Pectoral fins none; dorsal and anal well developed. Two pairs of nostrils on the upper surface of the snout: the posterior a long slit, the anterior in a small tube.
West Indies.

1. Enchelycore nigricans.

Muræna, sp., *Gronov. Zoophyl.* no. 163.
Muræna nigricans, *Bonnaterre, Encycl. Méth. Ichth.* p. 34.
Murenophis nigricans, *Lacép.* v. pp. 628, 641.
Muræna anguina, *Gronov. Syst.* ed. *Gray*, p. 18.
Enchelycore euryrhina, *Kaup, Apod.* p. 73.

Snout narrow, rather produced; the jaws cannot be shut in adult examples. Maxillary teeth biserial; canines very long and slender; eye of moderate size. The dorsal fin begins above the gill-opening. Tail nearly as long as the body. Uniform black.
Caribbean Sea.

a. Twenty-six inches long. Dominica. Purchased.
b. Half-grown. Grenada. Purchased.
c–d. Young. Barbadoes. Purchased.

Enchelynassa bleekeri, Kaup, Apod. p. 72, fig. 55, requires reexamination before it can be admitted into the system, as well as the *Holocentrum* found in the stomach of the typical specimen, and said to be *H. punctatissimum* from the Pacific. There are some points in Dr. Kaup's description which render it not improbable that this fish is identical with or closely allied to *Enchelycore*. Dr. Bleeker refers *Enchelynassa* simply to the synonymy of *Gymnothorax* (*Muræna*).

APPENDIX TO THE MURÆNIDÆ.

Under the name of Leptocephalidæ, or Helmichthyidæ, fishes have been comprised which, of small size, show a very low organization. They are narrow, elongate, more or less band-shaped, pellucid in a fresh state, but assuming a white colour when preserved in spirits, resembling a tapeworm, being quite as soft and flexible. We are indebted to Kölliker for a better knowledge of their internal structure *. The skeleton is entirely cartilaginous, or slight ossifications are only now and then visible, especially towards the end of the vertebral column. The latter is replaced by a chorda dorsalis, which is frequently divided into numerous segments. Now and then traces of neural arches are more or less conspicuous. The anterior end of the chorda passes into the cartilaginous base of the skull, the connexion not being by means of joint and ligaments. Hæmal arches are found on the caudal portion. Ribs none. The skull, like the vertebral column, is nearly entirely cartilaginous. The sphenoid, frontal, and jaw-bones are the first which may be distinguished, and the mandible has generally ossifications.

The muscles are generally not attached to the chorda, which is surrounded by a thick gelatinous mass, separating the lateral sets of muscles from each other. These muscles are attached to the external integument, each forming a thin flat angular band, the angle being directed forwards. However, specimens are frequently found in which the muscles are more developed, evidently at the expense of the gelatinous matter, which is diminished in quantity. They are attached to the chorda; and the entire fish has a more cylindrical form of the body (*Helmichthys*).

The nervous, circulatory, and respiratory organs are well developed. In those with a subcylindrical body the blood is red; in those with a flat body the blood-corpuscles show but rarely a faint coloration. There are four branchial arches; and *Tilurus* has pseudobranchiæ. The gill-openings are more or less narrow. The nostrils are double on each side, and the posterior is close to the eye.

The stomach has a large blind sac, and in *Leptocephalus* two lateral cæca. The intestine is straight, running close to the abdominal profile, with a small appendix directed forward, and a larger one directed backward. The vent is nearly always very small, and, in preserved examples, at least, it cannot always be discovered. Its position is variable, even in examples entirely similar in other points. Air-bladder none. No trace of generative organs.

---

* Siebold u. Kolliker, Zeitschr. iv. 1852, p. 360.

The vertical fins, when present, are confluent, with more or less conspicuous traces of rays; sometimes they are merely a fold of the skin, without any rays. Pectoral fins sometimes present, sometimes rudimentary, sometimes entirely absent. Ventrals none.

Most examples have series of round black dots along each side of the abdominal profile, along the lateral line, and sometimes along the dorsal fin. They remind us of the phosphorescent dots of many *Scopelidæ*, *Stomiatidæ*, and other pelagic fishes.

These fishes are found floating in the sea, frequently at a great distance from the land. Their movements are slow and languid. The largest specimen of *Leptocephalus* observed by me is 10 inches; but specimens of that size are very rare.

Prof. J. V. Carus has given an account of the organization of these fishes in a separate pamphlet, 'Ueber die Leptocephaliden,' Leipzig, 1861, 4to, from his own examinations, as well as from those of Prof. Kölliker. Considering the low organization, the embryonic condition of these creatures, the numerous variations of form and development of the several organs, the total absence of organs of reproduction, Carus came to the conclusion that they are nothing but early stages of development of other fishes, *Leptocephalus* perhaps of *Cepola*, *Tilurus* perhaps of *Trichiurus*.

Although this view of Prof. Carus deserved every consideration, the suggestion of a possible identity of *Leptocephalus* with *Cepola* was so obviously erroneous that his conclusions generally were received with suspicion, until Mr. Gill expressed his unqualified belief that the Leptocephalides are merely larval forms (Proc. Ac. Nat. Sc. Philad. 1864, p. 207). By his extensive ichthyological knowledge he was enabled to arrive more nearly at the truth with regard to their determination. He declared the typical *Leptocephali*, at least, to be the young of Congers, and *L. morrisii* the young of *Conger vulgaris*; *Hyoprorus* is referred to *Nettastoma*; whilst he is uncertain about *Stomiasunculus* and *Esunculus*. *Tilurus* is not mentioned in the short note about the subject.

I have fully convinced myself of the correctness of Mr. Gill's views with regard to *L. morrisii* and *Hyoprorus*; and I may add at once that I consider *Stomiasunculus* to be a young *Stomias*, and *Esunculus* probably a young *Alepocephalus*. It is not likely that *Tilurus* is an Apodal; the presence of pseudobranchiæ and width of the gill-openings leads me to suppose that it will prove to be an Acanthopterygian or Anacanthine fish.

Mr. Gill has not given the reasons which induced him to regard *L. morrisii* as a young Conger. Beside the similarity in the form of the head and its parts, I may draw attention to the coincidence in the number of vertebræ (156) and geographical distribution. The similarity in the form of the snout and position of the nostrils between *Hyoprorus* and *Nettastoma* is striking. It is true that the form of the abdominal organs is very different; but these organs undergo the greatest changes from the larval period to the perfect stage in all animals subject to a metamorphosis.

Assuming, then, that the Leptocephalides are undeveloped creatures, and especially that *L. morrisii* is a young Conger, the question arises whether they represent a normal stage in the developmental series of Congers, or whether they are *individuals arrested in their development at a very early period of their life, yet continuing to grow to a certain size without corresponding development of their internal organs, and perishing without having attained the characters of the perfect animal.* I do not think that anything but actual observation of the living animals will settle this question; from an examination of specimens preserved in spirits, I can direct attention to the following points only:—

1. Young, perfectly developed Congers are not common in collections. The smallest example I have examined is 4½ inches long—that is, smaller than numerous examples of *L. morrisii.* Therefore, if the young Conger is normally subject to a metamorphosis, this change is not accompanied by a corresponding growth of the entire animal, and the similarity of size of the larva and perfected animal cannot be brought forward as a proof that no such evolution takes place.

2. Specimens with a more cylindrical body, with the muscular system more developed (*Helmichthys*), are certainly merely a more advanced stage of the true *Leptocephali*. The snout is a little more elongate, much resembling that of an adult Conger; yet there is no perceptible progress in the development of the vertebral column. These examples are less common than the compressed forms. Their occurrence does not help us in deciding the question as put above. They may be merely a stage of a normal metamorphosis, whilst, on the other hand, *it is quite possible, and consistent with analogous cases in other classes of animals, that, if the* Leptocephali *are abnormally undeveloped forms, some individuals may in certain respects be more developed than others.*

3. It is evident that there are distinct forms even among the typical *Leptocephali*. They are chiefly characterized and distinguished by the form of the head and snout. This indicates a different origin; but I do not possess the means to refer these forms to their progenitors. It is probable that *Myrus, Ophichthys*, perhaps also *Muræna*, have their Leptocephaline forms. But whilst I admit this, I must confirm Prof. Carus's observation, that, at least as far as the Mediterranean *Leptocephali* are concerned, the variations in the situation of the vent, in the dentition, in the form of the body, &c. are so numerous and inconstant that no attempt should be made to distinguish and describe them specifically. This extraordinary variability favours the supposition that they are individuals abnormally arrested in their development.

The Leptocephalides being composed, as stated above, of very heterogeneous elements, I can place with the *Murænidæ* only *Leptocephalus* and *Hyoprorus*, although I shall shortly mention the other forms hereafter.

LEPTOCEPHALUS.

In a group of larval fishes in which the ordinary method of distinguishing species is impossible, a compilation of the synonymy is rather hazardous, although it is evident enough that more specific names have been proposed than can be justified, even by those who would treat of these fishes as of animals forming an independent part of the system. Therefore I propose to indicate those forms only which are distinguished by characters showing that they have, in all probability, a distinct origin, adding to each all those binominal names which refer to such a form, without intending to say that these names refer to the same species, as the larval states of distinct species may be extremely similar or almost identical.

I. *The forms with a rounded, obtuse snout.*

A. *With pectoral fins.*

1. *End of the tail not prolonged into a tapering point.*

a. *Mediterranean, Atlantic (Australian).*

a. Compressed form—L. morrisii.

Leptocephalus, *Gronov. Zoophyl.* no. 410, tab. 13. fig. 3 (bad); *Pennant, Brit. Zool.* iii. p. 139, pl. 25 (bad).

Leptocephalus morrisii, *Gm. Syst. Nat.* i. p. 1150; *Bl. Schn.* p. 133, tab. 108. fig. 2 (very bad); *Montague, Werner. Mem.* ii. p. 436, pl. 22. fig. 1; *Leach, in Zool. Misc.* iii. p. 10, pl. 126; *Deere, in Loud. Mag. Nat. Hist.* vi. p. 530; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 409, and 3rd edit. i. p. 40; *Peach, Ann. & Mag. Nat. Hist.* 1854, xiii. p. 238; *Kaup, Apod.* p. 147, and *Ann. & Mag. Nat Hist.* 1860, vi. p. 271; *Couch, Hist. Brit. Fish.* iv. p. 348, pl. 340.

Ophidium pellucidum, *Couch, in Loud. Mag. Nat. Hist.* v. pp. 313, 742.

Leptocephalus spalanzani, *Risso* (not *Ichth. Nice*, p. 85), *Eur. Mérid.* iii. p. 205; *Kaup, Apod.* p. 147, fig. 7.

—— gussoni, *Cocco, Isis,* 1831, p. 1340.

? —— candidissimus, *Costa, Faun. Nap. Pesci,* c. tab.

Body compressed, its depth being about equal to the length of the head. Sometimes the body, sometimes the tail, the longer. End of the tail generally rounded, not prolonged. Snout obtusely rounded. Eye rather large. Tongue distinct. Pectoral fins developed. Jaws with or without small teeth. Chorda dorsalis without ossifications.

Coasts of Europe; Australia.

a. Polperro. Purchased.

b, c. Bridgewater. From Leach's Collection. (Found by J. Anstice, Esq.)

d. Madeira. Presented by the Rev. R. T. Lowe.

e. South Europe. Presented by R. B. Webb, Esq.

f–r. Numerous examples. Messina.

s–x. Messina. Named *L. diaphanus* by Dr. Kaup.
y–β. Nice. Purchased of Mr. Wright.
γ. Australia. From the Haslar Collection.

β. Forms of L. morrisii *showing signs of a more advanced development.*

In these, the snout is somewhat less obtuse, somewhat more pointed and produced.

αα. The body is compressed, the chorda dorsalis without ossifications, showing merely segmentations:—*Leptocephalus bibronii*, Kaup, Apod. p. 149, fig. 12; and *Leptocephalus gegenbauri*, Kaup, Apod. p. 149. fig. 11.

a. Messina. Named *L. bibronii* by Dr. Kaup.
b. Mediterranean. Named *L. gegenbauri* by Dr. Kaup.

ββ. The body has become more cylindrical in consequence of the development of the muscular system; yet the chorda dorsalis is still cartilaginous:—*Leptocephalus köllikeri*, Kaup, Apod. p. 148, fig. 10; *Leptocephalus punctatus*, Kaup, Apod. p. 148, fig. 8.

a. Messina. Named *L. köllikeri* by Dr. Kaup.
b. Mediterranean. Purchased.

b. *Indian Ocean and Archipelago.*

Helmichthys oculus, *Peters, Monatsber. Ak. Wiss. Berlin*, 1866, p. 525, fig. 4.

Body rather thick, in consequence of the development of the muscular system; chorda dorsalis cartilaginous, but with the neural arches distinct. Snout obtusely rounded, short. Eyes large. Pectoral fins developed; vertical fins very low. Vent near to the middle or the total length. Jaws with minute teeth.

Amboyna; Madagascar.

a. Madagascar. Presented by Dr. J. E. Gray.

2. *End of the tail prolonged into a tapering point.*

Leptocephalus acuticaudatus, *Kaup, Apod.* p. 151, fig. 16.

Body compressed, its depth being more than the length of the head, which is rather small. End of the tail prolonged, tapering. Snout obtusely rounded. Pectoral fins. Teeth none.

Malabar.

B. *Pectoral fins none.*

Leptocephalichthys hypselosoma, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado*, p. 69.

Leptocephalus hypselosoma, *Bleek. Atl. Ichth. Mur.* p. 124, pl. 37. fig. 5.

Body compressed, rather short, of moderate depth. Head small. Snout obtuse. Pectoral fins none. Jaws toothless.

a. Type of the species, in very bad state. Celebes. From Dr. Bleeker's Collection.

II. *Snout pointed; pectoral fins present.*

Leptocephalus longirostris, *Kaup, Apod.* p. 150, fig. 14.

Body much compressed, elevated, and short, the upper and lower profiles abruptly rising behind the head. Head low, rather long. Eye of moderate size. Tongue not free in front. Jaws toothed. Muscular striæ vertical.

The specimen described by Kaup was from Messina. An example in the Liverpool Museum is stated to have been obtained 150 miles west off Cape Verde Islands. It is 65 millims. long, 18 millims. deep, the head being 5 millims.

III. *The forms with a pointed snout; in all, the pectoral fins are absent or rudimentary.*

A. *Mediterranean and North Atlantic.*

1. *Snout moderately pointed; a deep notch in the upper profile of the head.*

Body compressed, its depth being much more than the length of the head, which is very small. A deep notch in the upper profile, above the anterior angle of the orbit. Snout rather pointed, not prolonged. Eye of moderate size. Tongue not free in front. Pectoral fins none, or rudimentary. Jaws toothless. Chorda dorsalis without ossifications.

a–c. Algiers. Presented by Lieut.-Col. Playfair.

2. *Snout acutely pointed. Tongue free in front.*

Leptocephalus hæckelii, part., *Kaup, Ann. & Mag. Nat. Hist.* 1860, vi. p. 270, pl. 3. fig. B.

Body compressed, its depth being more than the length of the head. Vent generally behind the middle of the total length. Snout acutely pointed, not prolonged. Eye large. Tongue free in front. Pectoral fins none, or rudimentary. Jaws toothed. Chorda dorsalis without ossifications.

a, b. Messina. Named *L. hæckelii* by Dr. Kaup.
c, d–e. Mediterranean.

Leptocephalus brevirostris, *Kaup, Apod.* p. 150, fig. 15.

I regard these specimens as belonging to the form *L. hæckelii.* They have the hind part of the body shortened, the entire fish appearing more elevated. The form of the head is quite the same as in *L. hæckelii.*

a. Messina. Named *L. brevirostris* by Dr. Kaup.

3. *Snout acutely pointed. Tongue not free in front.*

Lepidopus pellucidus, *Risso, Ichth. Nice,* p. 152, pl. 5. fig. 19.
Helmichthys diaphanus, *Costa, Faun. Napol. Pesc.* tav. 31.
? Leptocephalus gracilis, *Storer, Mem. Am. Ac.* ii. p. 524.

Leptocephalus diaphanus, *Kaup, Apod.* p. 148, fig. 9.
—— yarrelli, *Kaup, Apod.* p. 149, fig. 13.
—— hæckeli, part., *Kaup, Ann. & Mag. Nat. Hist.* 1860, vi. p. 270.

Body compressed, its depth being more than the length of the head. Vent in the posterior half of the total length. Snout acutely pointed, produced. Eye large. Tongue not free in front. Pectoral fins none, or rudimentary. Jaws toothed. Chorda dorsalis without ossifications.

a, b. Messina. Named *L. hæckelii* by Dr. Kaup.
c. Messina. Named *L. yarrelli* by Dr. Kaup.
d. Sicily. Presented by W. Swainson.
e. Nice. Purchased of Mr. Wright.
f. Mediterranean. Named *L. diaphanus* by Dr. Kaup.
g. Santa Cruz. Presented by the Rev. R. T. Lowe.

Leptocephalus kefersteinii is a name proposed by Dr. Kaup (Ann. & Mag. Nat. Hist. 1860, vi. p. 270, pl. 3. fig. A) for examples belonging to the form *L. pellucidus*, but with a very small head.

a. Messina. One of the typical examples.

B. *Indian and South Atlantic.*

1. *Body short.*

Leptocephalus (Diaphanichthys) brevicaudus, *Peters, Monatsber. Ak. Wiss. Berlin*, 1864, p. 399.

Body much compressed, short. Head small. Snout acutely pointed, short. Fins none. Vent in the posterior half of the total length. Jaws toothed.—Sea between Maybate and Luzon.

2. *Body of moderate width and length.*

Leptocephalus dentex, *Cantor, Mal. Rept.* p. 333.
—— tænia, *Bleek. Nat. Tyds. Ned.-Ind.* viii. p. 428.
Leptocephalichthys tænioides, *Bleek. Enumer. Spec. Pisc. Arch. Ind.* p. 180.
Leptocephalus tænioides, *Bleek. Atl. Ichth. Mur.* p. 123, pl. 48. fig. 4.

Body much compressed, of moderate width and length, its depth being much more than the length of the head, which is very small. Snout acutely pointed. Eye small. Tongue not free in front. Fins none, or rudimentary. Teeth present or absent. Chorda dorsalis without ossifications.

a–b. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Type of *L. tænioides*, in very bad state. Amboyna. From Dr. Bleeker's Collection.
d–e. Collected by Capt. Thompson. From the Liverpool Museum.
f–h. Lat. 31° south, long. 45° west. From the Liverpool Museum.

The Liverpool Museum possesses, among others, an example which appears to have lost a considerable portion of the hinder part of its body; the part injured is perfectly healed. For this, as well as for numerous other examples, that institution is indebted to Capt. Whiteway.

3. *Body narrow and elongate. Tail obtusely pointed.*

Leptocephalus tænia, (*Cuv.*) *Quoy & Gaim. Voy. Uran. Zool.* p. 248; *Less. Voy. Coq. Zool.* ii. p. 126; *Kaup, Apod.* p. 151, fig. 18.
—— marginatus, *Kaup, Apod.* p. 152, fig. 19.
—— lineo-punctatus, *Kaup, Apod.* p. 152, fig. 20.
—— capensis, *Kaup, Apod.* p. 153.

Body much compressed, almost as thin as paper, narrow, elongate; but its depth is more than the length of the head, which is very small. Snout acutely pointed. Eye rather small. Tongue not free in front. Fins none, or rudimentary. Teeth present or absent. Chorda dorsalis without ossifications.

Indian Ocean; Cape of Good Hope; South Atlantic.

a, b–d. Zanzibar. From Lieut.-Col. Playfair's Collection.
e. 200 millims. long. South Atlantic, lat. 31° south, long. 45° west. From the Liverpool Museum.

The Liverpool Museum possesses an example of this form, 250 millims long. It is not in the least more developed than examples of half this length.

There is another very interesting example in the collection of the same museum, 90 millims. long, obtained in the South Atlantic by Capt. Whiteway. Its head is ossified; but the notochord is a simple soft thread. The muscles are of considerable consistency, and adhere to those of tho other side. The black spots along the lateral and abdominal lines are as large as the eye, and distinct from each other.

4. *Body narrow and exceedingly elongate*; *tail tapering into a filament.*

Body 270 millims. long and 6 millims. deep. Head small. Snout acutely pointed, at least twice as long as the eye; both jaws toothed. Gill-membranes united across the isthmus. Tongue not free in front. Pectoral fins none; vertical fins very indistinct. Chorda dorsalis without any ossifications. Intestine extending into the narrow portion of the posterior part of the body.

One example is in the Liverpool Museum. It is not known where it was obtained.

5. *Body elevated and elongate.*

Leptocephalus ceramensis, *Bleek. Atl. Ichth. Mur.* p. 123, pl. 49. fig. 3.

Body compressed, elongate, and elevated, with the head very small. Snout pointed; eye comparatively large. Tongue not free in front. Pectoral fins none. Jaws with or without teeth. Chorda dorsals extremely thin, thread-like.

a. Type of *L. ceramensis*, in bad state. Ceram. From Dr. Bleeker's Collection.
b–d. Old Collection.

Leptocephalus altus, *Richards. Voy. Ereb. & Terr. Fish.* p. 51, pl. 30. figs. 8–10.

Like the preceding form, but with rudimentary pectoral fins. Teeth strong.

For completeness' sake we have to mention the following forms, which are very insufficiently known :—

1. Leptocephalus stenops, *Kaup, Apod.* p. 150.—Messina. — Eyes unusually large and close together.
2. Leptocephalus dussumieri, *Kaup, Apod.* p. 151, fig. 17.—Malabar.

HYOPRORUS.

Hyoprorus messinensis, *Kölliker, Verh. phys. med. Ges. Würzb.* iv. 1854, p. 101 ; *Kaup, Apod.* p. 144, fig. 4.

Body much compressed and elevated ; head narrow, long ; snout long, with the upper jaw longest (as in *Nettastoma*). Teeth extremely minute. Nostrils as in *Nettastoma*. Pectorals very small*; vertical fins conspicuous. Vent in advance of the middle of the total length. Gill-openings narrow. Blood red.

Messina.

Mr. Gill refers (in my opinion very justly) this fish to *Nettastoma*. (See p. 48.)

TILURUS.

Oxystomus hyalinus, *Rafinesque*.
Leptocephalus trichiurus, *Cocco, Giorn. Sc. Lett. & Art. Sicil.* Palermo, 1829, xxvi. p. 138.
Tilurus gegenbauri, *Kölliker, Verh. phys. med. Ges. Würzb.* iv. 1854. p. 100.
—— trichiurus, *Kaup, Apod.* p. 145, fig. 5.
—— rissoi, *Kaup, Apod.* p. 146.

Body much compressed and elongate ; tail terminating in a thread. Head compressed, small, with the snout acutely pointed and of moderate length, the lower jaw being the longer. Both jaws toothed. Gill-openings wide. Intestine terminating far behind, at a point where the body is very narrow. Pectorals very small. Dorsal fin a broad fold of the skin, distinct from the nape ; anal a very low fold.

Mediterranean.

a, b, c, d, e, f, g. Numerous examples from Messina.

All these examples are remarkably alike in shape and in size. I do not know of any fish to which *Tilurus* could be referred. It evidently does not belong to the family Murænidæ.

---

* There is a curious passage in Dr. Kaup's description, *l. c.*, viz. " What Professor Stummeln mentions as representing pectorals." There is no such individual as Professor Stummeln ; and the explanation of the passage is probably this, that Professor Kölliker describes the pectoral fin as a " kleiner Stummel "—that is, a small rudiment.

STOMIASUNCULUS.

Stomiasunculus barbatus, *Kaup, Ann. & Mag. Nat. Hist.* 1860, vi. p. 270, pl. 3. fig. C.

This is evidently the young of *Stomias* or of a fish very closely allied to it. The specimen in the British Museum is in a bad state, but traces of the peculiar scale-pouches of *Stomias* may be distinctly seen. The barbel (with the hyoid) is more advanced towards the symphysis than in the adult figured by Valenciennes, pl. 545; the relative position of this barbel changes with the position of the bone, which is moveable. There are really no ventral fins; and future observations must show whether their absence is a character of the young state, or whether it is indicative of the existence of a species hitherto unknown. These fins are very small in *Stomias barbatus.* I cannot agree with Mr. Gill, who compares this fish to a larval Clupeoid.

a. One of the typical specimens. Messina. From Dr. Kaup.

ESUNCULUS.

Esunculus costai, *Kaup, Apod.* p. 143, fig. 3.

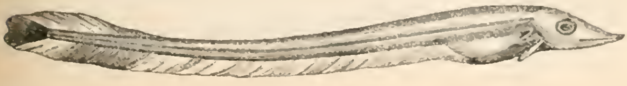
Even if a family of Leptocephalidæ be admitted into the system, to take its place near the apodal Physostomi, the fish described by Dr. Kaup under the name of *Esunculus* could not be referred to it, being possessed of abdominal ventral and three distinct vertical fins, of which the dorsal is nearly opposite to the anal. This fish is clearly the young of a form belonging to one of the more highly organized Physostomous families, perhaps of *Alepocephalus.*

POROBRONCHUS.

Helminthostoma delle Chiaje, *Cocco.*
Porobronchus linearis, *Kaup, Ann. & Mag. Nat. Hist.* 1860, vi. p. 272, pl. 3. fig. D.

This is the name given by Dr. Kaup to young *Fierasfer acus.* He figures an example without pectoral fins, which is in the British Museum, and in which, indeed, these fins cannot be discovered. They appear to have been torn off during the examination of the specimen. Other examples which I have obtained have the pectoral fins well developed. The first dorsal ray, which is sometimes as long as one-half of the fish, disappears entirely with age. From notes made by me many years ago, I see that these fishes have been named "*Helminthostoma delle Chiaje*, Cocco," but I am unable to find a reference to this name in a published work.

A fish known from a drawing by Dr. Hooker, and named *Prymnothonus hookeri* by Richardson (Voy. Ereb. & Terr. Fish. p. 51, pl. 30. figs. 6 & 7), appears to belong to the Murænidæ. The specimen was $1\frac{1}{4}$ inch long. Habitat not recorded. I reproduce the drawing in order to draw attention to this remarkable form.



Fam. 29. PEGASIDÆ.

Body entirely covered with bony plates, anchylosed on the trunk and moveable on the tail. Barbels none. The margin of the upper jaw is formed by the intermaxillaries and their cutaneous prolongation, which extends downwards to the extremity of the maxillaries. Gill-cover formed by a large plate, homologous to the operculum, præoperculum, and suboperculum; interoperculum a long fine bone, hidden below the gill-plate. One rudimentary branchiostegal. The gill-plate is united with the isthmus by a narrow membrane; gill-opening narrow in front of the base of the pectoral fin. Gills four, lamellated. Pseudobranchiæ and air-bladder absent. One short dorsal and anal fin, opposite to each other. Ventral fins present. Ovarian sacs closed.

Small marine fishes from the Indian Ocean and Australian seas.

These fishes have been associated with the Lophobranchiates, from which they differ in the structure of the gills, which are lamellated as in other fishes. I have long hesitated to place them in the Physostomi, as there are characters in which they closely resemble certain Acanthopterygians, and more especially the *Cataphracti*. The structure of their pectoral and ventral fins is more that of an Acanthopterygian than a Physostomous fish. The dorsal fin is single and soft; but in this respect they resemble *Aspidophoroides*; the fibrous condition of their vertebræ they have in common with *Amphisile* (which also has abdominal ventral fins), and with other fishes provided with an osseous dermal covering. However, as their opercular apparatus is more incomplete than in any Acanthopterygian, I have preferred to leave them, for the present, in this order*.

One genus only is known.

---

* The above remarks had been written when I learned, from a communication by Prof. Steenstrup, that for some time he had recognized the Acanthopterygian affinities of *Pegasus*, and that, in his opinion, their proper place in the system would be among the *Cataphracti*, near to *Aspidophorus* and *Aspidophoroides*. It must be a matter of regret that Prof. Steenstrup has been prevented by his other labours from publishing his researches on the subject, which, however, have been referred to by Kner, in Sitzgsber. Ak. Wiss. Wien, xli. pp. 821–822.

1. PEGASUS.

Pegasus, *L. Syst. Nat.* i. p. 418.

Body broad, much depressed. Pectoral fins horizontal, broad, long, composed of simple rays, some of which are sometimes spinous. Ventral fins one- or two-rayed, the outer ray being long. Upper part of the snout produced into a shorter or longer process. Mouth inferior, toothless. Suborbital ring well developed, forming a suture with the gill-cover. Intestinal tract rather short, with one or two complete circumvolutions. Vertebræ not numerous, thin; ribs none.

Indian Ocean and archipelago; Chinese and Australian seas.

1. Pegasus draconis.

Valent. iii. p. 428, tab. 271; *Ruysch*, p. 12, t. 7. figs. 2 & 3.
Cataphractus, sp., *Gronov. Zoophyl.* no. 356, tab. 12. figs. 2 & 3.
Pisciculus amboinensis, *Gronov. Mus. Ichth.* i. p. 65. no. 146.
Pegasus draconis, *L. Syst. Nat.* i. p. 418; *Bl. Ausl. Fisch.* i. p. 52, taf. 109. figs. 1 & 2; *Lacép.* ii. p. 78, pl. 2. fig. 3.
Pegasus volans, *Lacép.* ii. p. 83; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 307; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 27.
—— latirostris, *Richards. Ichth. Chin.* p. 203.
Cataphractus draco, *Gronov. Syst.* ed. *Gray*, p. 144.
Pegasus draco, *Kaup, Lophobr.* p. 5, pl. 1. fig. 3 (*P. natans*); *Günth. in Fish. Zanzibar*, p. 138.

D. 5. A. 5. P. 11. V. 2.

Vent nearly midway between the posterior margin of the eye and the root of the caudal fin. Tail composed of eight rings. Trunk gibbous, the median depressed part being divided by three cross ridges. Obtuse tubercles at the meeting points of the transverse and longitudinal ridges. A pair of deep grooves on the neck. The first and second and the fourth and fifth tail-rings have a compressed spine directed backwards in the middle of the side. The fifth pectoral ray not stronger than the others. Snout prolonged, with four denticulated ridges, the two lower of which are dilated with age, forming a semioval expansion. Body finely reticulated with brown; snout and the two or three last caudal rings black. Pectoral rays with fine brown dots; pectoral fin with a broad milky-white margin, within which there is another concentrical band of a whitish colour.

Indian Ocean and archipelago.

a. Adult: dry. Ceram.
b. Half-grown. Amboyna. Purchased of Hr. Frank.
c. Half-grown. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
d–e. Half-grown and young: dried. Zanzibar. From the Collection of Lieut.-Col. Playfair.
f, *g*, *h–k*. Adult (4 inches long) and young.
l–n. Adult: dried.

2. Pegasus volans.

Pegasus volans, *L. Syst. Nat.* i. p. 418.
—— laternarius, *Cuv. Règne. An.*; *Kaup, Lophobr.* p. 3, tab. 1. fig. 4.

D. 5. A. 5. P. 10. V. 2. Vert. 7+12.

Vent nearly midway between the anterior margin of the eye and the root of the caudal fin. Tail composed of eleven rings. Back of the trunk with two median ridges, each with three compressed and more or less trenchant longitudinal tubercles; no groove behind the head. The second, third, and fourth tail-rings have a spine directed backwards in the middle of the side. The fifth pectoral ray strong, spine-like. Snout sometimes short, pointed, with or without minute spines, sometimes prolonged into a five- or six-ridged process, each ridge being finely denticulated. Most of the specimens show two broad brownish bands across the tail, the posterior being at some distance from the root of the tail. Pectoral rays with brown spots.

China.

a. A great number of dried adult and half-grown specimens, partly from Chinese insect-boxes.

3. Pegasus natans.

Pegasus natans, *L. Syst. Nat.* i. p. 418; *Bl. Ausl. Fisch.* i. p. 53, taf. 121. figs. 2 & 3; *Richards. Voy. Sulph. Fish.* p. 118, pl. 50. figs. 5–7.
Cataphractus, sp., *Gronov. Zoophyl.* no. 357, tab. 11. figs. 2 & 3.
Pegasus spatula, *Lacép.* ii. p. 85.
—— volans, *Richards. Voy. Sulph. Fish.* pl. 50. figs. 8–10.
—— pristis, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 606; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 28.
Cataphractus anceps, *Gronov. Syst.* ed. *Gray*, p. 144.

D. 5. A. 5. P. 11. V. 3. Vert. 7+14.

Tail (without caudal fin) as long as, or longer than, the body to the end of the snout. Tail composed of twelve rings, tapering and very much flattened behind. Ridges on the upper side of the body obtuse, without tubercles; shields uniformly finely granulated. Pectoral rays equally slender. Snout prolonged into a long flat sword-like process, truncated in front, and denticulated on the side, the teeth directed backwards. Tail with broad brown cross bands, one below the dorsal being the most constant. Dorsal and pectoral fins with brown dots.

Seas of China and Australia.

Var. *a*. Snout as long as the distance between the eye and vent. Back of the body dotted with black.

a. Adult. North China. Purchased of Mr. Jamrach.
b. Adult. China Seas. Presented by Sir J. Richardson [*].

---

[*] It may be remarked that all these examples were in the British-Museum collection at the time when the 'Catalogue of Lophobranchiate Fish' was prepared. See Kaup, in Wiegm. Arch. 1861, p. 116.

c–d. Half-grown. New Guinea. Presented by Vice-Admiral Sir E. Belcher *.
e. Half-grown. Freycinet's Harbour. Voyage of the 'Herald.'
f–i. Half-grown. From the Haslar Collection *.

Var. *β*. Snout shorter than the distance between eye and vent. Back marbled with brown above.

k–l, *m–o*. Fine specimens. Moreton Bay.
p. Numerous adult examples. Hammond Island, Torres Straits. Collected by F. M. Rayner, Esq.
q. Adult. Australia. Collected by Mr. MacGillivray.

4. Pegasus lancifer.

Pegasus natans, *Kaup, Lophobr.* p. 4, tab. 1. fig. 2 (this figure is evidently taken from one of the specimens in the British Museum).
Pegassus lancifer, *Kaup, Wiegm. Arch.* 1868, p. 117.

D. 5. A. 5. P. 15. V. 2.

Tail (without caudal fin) much longer than the body to the end of the snout, composed of fourteen or fifteen rings, of which the six posterior are more or less confluent, much depressed, tape-like. The trunk is broad, exceedingly depressed, nearly flat above, with narrow vertical sides. The dorsal ridges usually found in this genus are linear; and from the centre of each shield radiate raised lines, forming star-like figures. Pectoral rays equally slender. Snout prolonged into a very thin four-ridged process, about twice as long as the orbit; the ridges are beset with minute spines. Upper parts nearly uniform brown.

Tasmania.

a. Four inches long. Tasmania. Presented by Dr. Milligan.
b. Four inches long. Old Collection.

Order V. LOPHOBRANCHII.

The gills are not laminated, but composed of small rounded lobes, attached to the branchial arches. Gill-cover reduced to a large simple plate. Air-bladder simple, without pneumatic duct *. A dermal skeleton, composed of numerous pieces arranged in segments, replaces more or less soft integuments. Muscular system not much developed. Snout produced. Mouth terminal, small, toothless, formed as in Acanthopterygians.

Lophobranchii, *Cuv. Règne Anim.*

I have excluded from this order the Pegasidæ, for reasons stated above (p. 146). On the other hand, I consider the separation of *Solenostoma* into a distinct division necessary, agreeing so far with Dr. Kaup. They are the Acanthopterygians of this order.

Fam. 1. SOLENOSTOMIDÆ.

Solenostomidæ, *Kaup, Lophobr.* p. 1.

Gill-openings wide. Two dorsal fins, the rays of the anterior not articulated. All the other fins well developed.

Only one genus is known :—

1. SOLENOSTOMA.

Solenostomus, *Lacépède.*

Snout formed as in *Siphonostoma*. Body compressed, with very short tail. All parts covered with thin skin, below which there is a dermal skeleton formed by large, star-like ossifications. The soft dorsal and anal fins on elevated bases; caudal fin long. Ventral fins inserted opposite to the anterior dorsal, close together, seven-rayed; they are free in the male, but in the female their inner side coalesces with the integuments of the body, a large pouch for the reception of the eggs being formed thereby. Air-bladder and pseudobranchiæ absent. Branchiostegals four, very thin. Intestinal tract very simple, with a stomachic dilatation, without pyloric appendages. Ova very small.

---

* See Müller, Abhandl. Berl. Ak. 1844, p. 174. In *Siphonostoma typhle* I find a band leading from the air-bladder to the dorsal part of the œsophagus; it is probably an obliterated duct.

Indian Ocean and archipelago.

The dermal *skeleton* (in *S. cyanopterum*) is formed by star-like ossifications, four in each horizontal and vertical series on the side of the fore part of the trunk; each consists of four or three radiating branches, by which it joins the neighbouring bones; on the hind part of the trunk and tail the series are diminished to two. The dorsal and abdominal profiles in front of the fins are protected by similar bones. The vertebral column is composed of eighteen abdominal and fifteen caudal vertebræ, the vertebræ gradually decreasing in length backwards, so that the shortness of the tail is caused not only by the smaller number of vertebræ, but also by their much lesser length. Neural and hæmal spines are developed. The pelvis consists of two pairs of cartilaginous laminæ, the convex margin of the anterior fitting into an angle of a dermal bone which separates the pelvis from the well-ossified humeral arch.

There is a peculiar provision for the retention of the eggs in the sac, and probably for the attachment of the embryo. The inner walls of the sac are lined with long filaments, arranged in series along the ventral rays, and more numerous and longer at the base of the rays than in the middle of their length, behind which they disappear entirely. They are also more developed in examples in which eggs are deposited in the sac than in those which have the sac empty. The filaments most developed have a length of half an inch, and are beset with mamilliform appendages. A slightly undulated canal runs along the interior of the filament.

1. Solenostoma cyanopterum.

Solenostomus paradoxus, *Richards. Ichth. Chin.* p. 203; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 308; *Kaup, Lophobr.* p. 2.

Solenostoma cyanopterum, *Bleek. l. c.* vi. p. 506; *Günth. in Fish. Zanz.* p. 137, pl. 20. figs. 2 & 3.

D. 5/18. A. 16–18. P. 26. V. 7.

The depth of the snout in the middle of its length is two-ninths of its length. Caudal peduncle shorter than the base of the dorsal fin. Brown, minutely dotted with black and whitish; or pink, with purplish-brown spots. First dorsal fin with two large ovate black ocelli between the first three rays.

From Zanzibar to China.

a, b, c–c. Adult females and a male. Zanzibar. Presented by Lieut.-Col. Playfair.

f. One of the typical specimens. Ceram. From Dr. Bleeker's Collection.

g. Adult. China. Presented by Vice-Admiral Sir E. Belcher.

2. Solenostoma paradoxum.

Seba, iii. 34. 3.
Fistularia paradoxa, *Pall. Spicil. Zool.* viii. p. 32, tab. 4. fig. 6; *Bl. Schn.* tab. 39. fig. 1.
Solenostomus paradoxus, *Lacép.* v. p. 36; *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 506.

D. 5/20. A. 20. P. 25. V. 7.

The depth of the snout in the middle of its length is one-sixth of its length. Caudal peduncle shorter than the base of the second dorsal fin. Brown, with irregular orange-coloured spots. First dorsal fin with two large ovate black ocelli between the first three rays.

Amboyna.

a. Adult female. From Dr. Bleeker's Collection.

3. Solenostoma brachyurum.

Bleek. Nat. Tyds. Ned. Ind. viii. p. 433.

The depth of the snout in the middle of its length is less than one-sixth of its length. Caudal peduncle slender, longer than the base of the second dorsal. Pink, with red spots.

Amboina.

a. One of the typical examples, probably a male, 2 inches long, in bad state. From Dr. Bleeker's Collection.

I hesitate to admit this as a distinct species; however, the specimen is in so bad a condition that it does not admit of examination. Considering that we know, at present, nothing of the changes which *Solenostoma* undergoes during its growth, it is much to be regretted that Dr. Bleeker omitted to examine these examples more carefully, and that he was satisfied with merely attaching a new name to them.

Fam. 2. SYNGNATHIDÆ.

Syngnathidæ, *Kaup, Lophobr.* p. 5.

Gill-openings reduced to a very small opening near the upper posterior angle of the gill-cover. One soft dorsal fin; no ventrals, and sometimes one or more of the other fins also absent.

Chiefly marine fishes, occurring in all parts of the tropical and temperate regions; many species entering fresh waters.

Synopsis of the Genera.

First Group. **Syngnathina.**

Tail not prehensile, generally with a caudal fin.

I. Humeral bones moveable .... 1. Siphonostoma, p. 154.

II. Humeral bones united; caudal fin present; male with the egg-pouch on the tail.

Pectorals well developed; dorsal edges of trunk and tail not continuous; dorsal fin opposite or near to the vent ... 2. Syngnathus, p. 155.
Pectorals present; dorsal edges of trunk and tail continuous, if distinct; dorsal fin opposite or near to the vent ... 3. Ichthyocampus, p. 176.
Pectorals absent .... 4. Nannocampus, p. 178.
Dorsal fin placed at a great distance behind the vent. 5. Urocampus, p. 179.

III. Humeral bones united; pectoral and caudal fins present; male with the egg-pouch on the abdomen.

Ridges of the body prominent and distinct; caudal fin not unusually long. 6. Doryichthys, p. 179.
[Caudal fin very long .... Leptoichthys, p. 187.]
Only the dorsal ridges are distinct .... 7. Cœlonotus, p. 188.

IV. Caudal fin none; male with the egg-pouch on the tail; body depressed. 8. Stigmatophora, p. 189.

V. Pectoral fins none; caudal absent or rudimentary; male with the ova attached to the abdomen, without closed pouch.

Adipose fins none.................................... 9. Nerophis, p. 190.
Adipose fins along the trunk and tail .... 10. Protocampus, p. 193.

Second Group. **Hippocampina.**

Tail without caudal fin, prehensile.

I. Body depressed .... 11. Gastrotokeus, p. 194.

II. Body compressed, not or scarcely dilated. Shields hard, rugose, without elongate processes .... 12. Solenognathus, p. 195.

III. Body compressed. Shields with elongate processes; occiput not compressed. 13. Phyllopteryx, p. 196.

IV. Body compressed; occiput compressed into a crest.

Occipital crest without coronet .... 14. ACENTRONURA, p. 198.
Occipital crest with a coronet........... .... 15. HIPPOCAMPUS, p. 198.

First Group. SYNGNATHINA.

Tail not prehensile, generally with a caudal fin.

1. SIPHONOSTOMA.

Siphonostomus, *Kaup, Lophobr.* p. 48.

Body not dilated, with distinct edges; the upper caudal edge continuous with the lateral line, but not with the dorsal edge of the trunk. Pectoral and caudal fins well developed; dorsal fin of modederate length, opposite to the vent. Humeral bones moveable, not united into a breast-ring. Males with an egg-pouch on the tail, the eggs being covered by cutaneous folds.

Coasts of Europe.

1. Siphonostoma typhle.

Acus aristotelis, *Willughby*, p. 158, tab. i. 25. fig. 1; *Salvian*, fol. 68. pl. P. vii.
Typhle marina, *Bellon. De Aquat.* p. 446.
Syngnathus, sp., *Artedi, Synon.* p. 1. no. 2; *Gen.* p. 1. no. 4; *Spec.* p. 2. no. 2.
Syngnathus typhle, *L. Syst. Nat.* i. p. 416; *Donov. Brit. Fish.* iii. pl. 56; *Turton, Brit. Faun.* iii. p. 116; *Flem. Brit. An.* p. 175; *Jenyns, Man.* p. 485; *Yarrell, Brit. Fish.* ii. p. 332, 2nd edit. ii. p. 439, 3rd edit. ii. p. 406; *Parnell, Werner. Mem.* vii. p. 396; *Fries, Wiegm. Arch.* 1838, p. 241, tab. 6. fig. 2; *Risso, Ichth. Nice*, p. 62, and *Eur. Mérid.* iii. p. 178; *Malmgren, Wiegm. Arch.* 1864, p. 343.
—— rondeletii, *De la Roche, Ann. Mus.* xiii. 1809, p. 324, pl. 21. fig. 5.
—— viridis, *Risso, Ichth. Nice.* p. 65, and *Eur. Mérid.* iii. p. 179.
—— pelagicus, *Risso, Ichth. Nice*, p. 63.
—— pyrois, *Risso, Eur. Mérid.* iii. p. 180.
—— acus, *Ekström, Fische v. Mörkö*, p. 123, tab. 6. figs. 1, 2.
—— rhynchænus, *Michahelles, Isis*, 1829, p. 1014.
—— argentatus, *Pallas, Zoogr. Ross.-As.* iii. p. 120; *Rathke, Mém. Ac. Sc. Pétersb. Sav. étrang.* iii. p. 316, pl. 2. figs. 5 & 6; *Nordm. in Démid. Voy. Russ. Mérid.* iii. p. 539, pl. 32. fig. 1.
—— ponticus, *Pallas, l. c.* p. 118.
—— typhloides, *Benn. Proc. Zool. Soc.* 1835, p. 92.
Siphonostomus pyrois, *(Bonap.) Kaup, Lophobr.* p. 48.
—— typhle, *(Bonap.) Kaup, l. c.* p. 49.
—— rondeletii, *(Bonap.) Kaup, l. c.* p. 50.
—— argentatus, *Kaup, l. c.*
Broad-nosed Pipe-fish, *Couch, Fish. Brit. Isl.* iv. p. 355, pl. 239.

D. 31–39. Snout compressed, as deep, or nearly as deep, as the head, and not quite twice as long, or nearly twice as long, as the remaining portion of the head. Origin of the dorsal fin opposite to or somewhat in advance of the vent. Trunk with eighteen or nineteen, tail with from thirty-three to thirty-five osseous rings.

Coasts of Europe.

a–e. Adult and young. Sweden.
f–g. Male with young and female. Bohuslän. Presented by Hr. A. W. Malm.
h. Several adult and half-grown specimens: dried. Scotland. Purchased of Dr. Parnell.
i–k. Adult: stuffed. England.
l–m. Male and female. Dorsetshire. From Mr. Yarrell's Collection.
n–p. Adult and half-grown. Gibraltar. Presented by P. L. Sclater, Esq.
q. Adult. South Europe. Presented by R. B. Webb, Esq.
r. Adult. Nice. Purchased.
s, t, u–v, w–x. Adult and half-grown. Mediterranean.
y. Adult. Named "*S. pyrois*" by Dr. Kaup.
z. Adult. Named "*S. argentatus*" by Dr. Kaup.
α–γ. Adult and half-grown. Black Sea. From Mr. Millingen's Collection.
δ, ε–ζ. Half-grown.

2. Siphonostoma rotundatum.

Syngnathus rotundatus, *Michahelles, Isis*, 1829, p. 1014.
Siphonostomus rotundatus, (*Bonap.*) *Kaup, Lophobr.* p. 51.

D. 32. Snout compressed, not so deep as the head, and twice as long as the remaining portion of the head, or even longer. Origin of the dorsal fin slightly in advance of the vent. Trunk with twenty, tail with thirty-four osseous rings.

Mediterranean.

a. Adult male. Named "*S. rotundatus*" by Dr. Kaup.

Beside this specimen, the British Museum does not possess another at present, although Dr. Kaup speaks of numerous examples presented by Michahelles, who never gave an example to a British collection. With regard to the species, it may prove to be another variety of *S. typhle*; but having one example only, I cannot give so positive an opinion as in the case of *S. pyrois, argentatus*, &c.

2. SYNGNATHUS*.

Syngnathus, sp., *Artedi*.
Syngnathus, Corythoichthys, Trachyrhamphus, et Halicampus, *Kaup*.

---

* 1. Syngnathus brachyrhynchus, *Kaup, Lophobr.* p. 42.—Bourbon.—Said to be very similar to *S. acus*.
2. —— sundaicus, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 21.—Java.—Described from a figure.
3. Corythoichthys vittatus, *Kaup, Lophobr.* p. 26.—Brazil.—D. 20. Osseous rings 17+37. Operculum?
4. Syngnathus fucicola, *Bennett, Proc. Comm. Zool. Soc.* 1832, p. 5.—Pinnis pectoralibus, dorsalibus, analibus et caudalibus præditus; scutis dors. 14,

Body with the ridges more or less distinct, the dorsal edge of the trunk not being continuous with that of the tail. Pectoral fins well developed, caudal present. Dorsal fin opposite or near to vent. Humeral bones firmly united into the "breast-ring." Males with an egg-pouch on the tail, the eggs being covered by cutaneous folds.

Inhabitants of all the seas of the temperate and tropical regions, some of the species entering or living in fresh water.

The numerous species may be subdivided thus:—

- A. Operculum without, or with only a basal ridge.
  - *a.* Base of the dorsal fin not raised above the level of the back, p. 156.
  - *b.* Base of the dorsal fin elevated, p. 167.
- B. Operculum crossed by a ridge in its entire length, p. 169.

A. *Operculum without ridge, or with only a short ridge on its basal portion.*

a. *Base of the dorsal fin not raised above the level of the back.*

1. **Syngnathus phlegon.**

Syngnathus phlegon, *Risso, Eur. Mérid.* iii. p. 181; *Kaup, Lophobr.* p. 41.

D. 40–42. Osseous rings 19 + 49–50.

The length of the snout equals the distance of the front margin of the orbit from the second body-ring. A low ridge is continued from the supraorbital edge on to the temple; anterior part of the operculum with a faint ridge. Shields terminating in a spine, inconspicuous in young examples. Tail very long, nearly twice as long as the body; caudal pouch twice as long as the trunk (without the head). Dorsal fin commencing in advance of the vent. Caudal fin well developed.

Mediterranean and neighbouring parts of the Atlantic; Cape of Good Hope.

---

præanal. 16, caud. 26. Corpore caudaque transversim pinnaque dors. oblique nigrescenti fasciatis. D. 28.—Atlantic.—The typical specimens are lost.

5. Syngnathus flavofasciatus, *Rüppell, N. W. Fisch.* p. 144.—Capite brevi, nonam partem corporis æquante, rostro dimidio longitudine capitis, vertice crista serrata, pinnis ventralibus breviusculis, D. 31. Capite lineis longitudinalibus quinque fuscis.—Red Sea.—The single specimen observed, $3\frac{1}{2}$ inches long, has been lost, so that the remarkable statement of this species being provided with ventral fins cannot be explained.
6. Dermatostethus punctipinnis, *Gill, Proc. Ac. Nat. Sc. Philad:* 1862, p. 283. —California.—D. 40–42. Osseous rings 20 + 39. Breast-shield covered with skin; occiput elevated and keeled.
7. Microphis tenuis, *Blyth, Journ. As. Soc. Beng.* xxvii. p. 272.—Andaman Islands.—Osseous rings 16 + 36.
8. Syngnathus brachycephalus, *Poey, Repert. Fis.-nat. Cuba,* ii. p. 444.—Cuba.
9. —— tenuis, *Poey, l. c.*—Cuba.

a–d. Half-grown and young. South Europe. Presented by R. B. Webb, Esq.
e–f. Half-grown (males). Cosseir (?). Purchased of Mr. Warwick.

2. Syngnathus peckianus.

Syngnathus typhle, *Mitch. Lit. & Phil. Trans. New York*, i. p. 475.
—— peckianus, *Storer, Report*, p. 163, and *Synopsis Fish. N. Amer.* p. 490; *Ayres, Bost. Journ. Nat. Hist.* iv. p. 282; *Storer, Mem. Am. Acad.* viii. p. 412, pl. 33. fig. 3.
—— fuscus, *Storer, Report*, p. 162.
Syngnathus fasciatus, *Dekay, New York Faun. Fish.* p. 319, pl. 54. fig. 174.
—— viridescens, *Dekay, l. c.* p. 321, pl. 54. fig. 176.

D. 40–45. Osseous rings 19+40.

The high dorsal fin occupies nine or ten rings, *four or five of which belong to the body*. Snout as long as the remaining part of the head. Tail one-half longer than the body. Twelve or thirteen dark cross bands on the body and tail.

Atlantic coasts of the United States.

a. Young. Presented by the Smithsonian Institution.

3. Syngnathus acus.

Great Pipe Fish; Tangle-Fish.
Acus 2^{da} species, *Rondel.* viii. c. 4. p. 229; *Aldrovand.* i. c. 22. p. 105.
Syngnathus, sp., *Artedi, Synon.* p. 2. no. 3; *Gen.* p. 1. no. 3; *Spec.* p. 3. no. 3.
Syngnathus acus, *L. Syst. Nat.* i. p. 416; *Bl.* tab. 91. fig. 2; *Lacép.* ii. p. 39, pl. 2. fig. 1; *Bl. Schn.* p. 414; *Michahelles, Isis*, 1829, p. 1012; *Turton, Brit. Faun.* p. 116; *Flem. Brit. An.* p. 175; *Jenyns, Man.* p. 484; *Yarrell, Brit. Fish.* ii. p. 325, 2nd edit. ii. p. 432, 3rd edit. ii. p. 400; *Fries, Wiegm. Arch.* 1838, p. 239; *Parnell, Werner. Mem.* vii. p. 394; *Kaup, Lophobr.* p. 41.
—— typhle, *Bloch*, tab. 91. fig. 1; *Bl. Schn.* p. 414.
—— variegatus, *Pall. Zoogr. Ross.-As.* iii. p. 119; *Rathke, Mém. Ac. Sc. Pétersb. Sav. étrang.* iii. p. 315, pl. 2. figs. 7 & 8; *Nordm. in Démid. Voy. Russ. Mérid.* iii. p. 541; *Kaup, Lophobr.* p. 42.
—— pelagicus, *Donov. Brit. Fish.* iii. pl. 58; *Turton, Brit. Faun.* p. 117; *Fleming, Brit. An.* p. 176; *Jenyns, Man.* p. 486.
—— rubescens, *Risso, Ichth. Nice*, p. 66, and *Eur. Mérid.* iii. p. 180; *Kaup, Lophobr.* p. 43.
—— ferrugineus, *Michahelles, in Isis*, 1829, p. 1013.
—— agassizi, *Kaup, l. c.* p. 38 (young) (not *Michahelles*).
—— tenuirostris, *Rathke, Mém. Ac. Sc. St. Pétersb. Sav. étrang.* iii. p. 313, pl. 2. figs. 11 & 12 (head); *Nordm. l. c.* p. 541, pl. 32. fig. 2; *Kaup, Lophobr.* p. 44.
—— bucculentus, *Rathke, Mém. Ac. Sc. St. Pétersb. Sav. étrang.* iii. p. 317, pl. 2. figs. 9 & 10; *Nordmann, l. c.* p. 542, pl. 32. fig. 3 (young).
—— brevirostris, *Kaup, Lophobr.* p. 37 (young).
—— cuvieri, *Kaup, l. c.* p. 38 (young).
—— delalandi, *Kaup, l. c.* p. 45.

D. (31–) 37–41. Osseous rings (15–18) 19–21 + 38–44.

The length of the snout equals the distance of the front margin of the orbit from the root or extremity of the pectoral fin; in young examples it is much shorter, only equal to the remaining portion of the head. A low ridge, generally finely serrated, runs along the median line of the upperside of the snout, of the crown and nuchal shields; supraorbital ridge continued over the temporal region; anterior part of the operculum with a faint ridge. Shields without spines. Lateral line and upper caudal edge not continuous *in the adult*. Tail considerably longer than the body, the caudal pouch being nearly as long as the body. *Dorsal fin commencing above or somewhat in advance of the vent.* Caudal fin well developed.

Black Sea; Mediterranean; Eastern parts of the Atlantic; Cape of Good Hope.

a–c. Young. Bohuslän. Presented by Hr. A. W. Malm.
d. Adult: skin. Holland. From Gronow's Collection.
e, f. Several adult, half-grown, and young examples. Firth of Forth.
g. Several adult examples, dried. Firth of Forth. From Dr. Parnell's Collection.
h. Young male. Wales. Presented by Mrs. Grey.
i–k. Adult males. Falmouth. Purchased.
l–n. Adult, dried. England.
o. Young. England. Presented by Mr. Moore.
p. Fine male specimen. Guernsey. Presented by Dr. A. Günther.
q. Fine male specimen. Madeira. Presented by J. Y. Johnson, Esq.
r–u. Half-grown and young. Gibraltar. Presented by P. L. Sclater, Esq.
v, w. Several specimens. Mediterranean. Purchased.
x. Half-grown. Sicily. Purchased of M. Parzudaki.
y. Adult. Naples. Purchased of M. Parzudaki.
z. Several young examples. Black Sea. From Mr. Millingen's Collection.
α. Adult. Cape of Good Hope. Presented by Sir A. Smith.
β. Adult: dried. Cape of Good Hope. Presented by Sir A. Smith.
γ. Adult. ? Madagascar.
δ–η. Adult. From the Collection of Dr. van Lidth de Jeude.
θ–κ. Adult. From the Haslar Collection.
λ–μ. Adult. Named *S. rubescens* by Dr. Kaup.
ν, ξ, ο–π, ρ–ς, τ–ω. Adult, half-grown, and young.

Dr. Kaup's *S. agassizii* is not the species described by Michahelles under that name, as he describes the latter as *S. murœna*; but it is identical with *S. bucculentus* of Rathke.

On reading only the diagnoses of Dr. Kaup's *S. agassizii* and *S. cuvieri*, one is compelled to admit that the differences indicated would be quite sufficient for specific distinction:

S. agassizii is described as having the "snout as long as the head. From thirteen to sixteen rings anterior to the dorsal fin. D. 22."

S. cuvieri is described as having the "snout half the length of the head. Eleven or twelve rings before the dorsal fin, of which two belong to the body. D. 38–41."

However, these apparently important differences are nothing but inaccuracies of the describer, who gives the measurements of individuals contradicting the statement of the diagnosis, and showing that the relative length of the snout is precisely the same in both. Why he states that "two rings belong to the body," whilst, in fact, all the eleven or twelve rings before the dorsal fin are body-rings, is not clear. There is an error or omission also in this sentence. The number of twenty-two dorsal rays in *S. agassizii* = *bucculentus* (Rathke, spelt *luculentus* by Dr. Kaup) is not in accordance with those given by previous writers, Rathke stating 35–36, and Nordmann 35.

Having such short-snouted examples from the North Sea, Mediterranean, and Black Sea, I have come to the conclusion that they are young *S. acus*.

However, it is very singular that young examples (from 4 to 7 inches) differ so much from old ones (8 to 18 inches), that, if the differences were observed in examples of the same size, they would be considered to be specific. Beside the shortness of the snout, the number of osseous rings of the body is less (15–19), frequently also that of the dorsal rays (sometimes as low as 31), and the lateral line is more often continuous with the upper caudal edge than interrupted.

In the following list I intend to show the great variability of these examples :—

		inch.	D.	Oss. rings.	Lat. line.
1. Firth of Forth	3 ♀	4½–6½	36–40	16+42 or 43	contin.
2. " "	1 ♂	5	40	17+40	contin.
3. England	1 ♀	4½	43	16+41	interr.
4. Wales	1 ♂	5	35	16+41	interr.
5. Bohuslän	1 ♂	6	37	17+42	interr.
6. "	1 ♂	5	39	17+40	contin.
7. "	1 ♀	5	42	17+41	contin.
8. Gibraltar	2 ♀	4	31–34	18+38	contin.
9. Black Sea	5 ♂ & ♀	5-6½	31–34	16+38	contin.
10. Trieste (Type of *S. brevirostris.*)	1 ♂	4½	31	17+35	contin.
11. Sicily	1 ♀	6½	37	19+42	contin.
12. ?	1 ♀	6	40	16+42	contin.
13. ?	1 ♂	4	40	15+38	interr.

Although I have examined a good many more young examples than those mentioned, I have never met with a single *Syngnathus* under 8 inches in length which agreed entirely with a *S. acus* above that size. And still more curious is the fact that these fishes (which cannot be considered to be fully developed) are capable of propagating their species, the ovaries of the females and the pouches of the males being filled with mature ova.

4. Syngnathus louisianæ.

Closely allied to *S. acus*, *schlegelii*, *griseo-lineatus*, &c., but with the dorsal fin more advanced.

D. 36. Osseous rings 19 + 36.

Body not deeper than broad. The length of the snout equals the distance of the front margin of the eye from the extremity of the pectoral fin. The length of the postorbital part of the head is a little more than that of two body-rings (measured laterally). Supraorbital edge raised, and continued into a distinct ridge on the side of the crown of the head. Nuchal plates with a distinct median ridge. Operculum finely granulated, with a ridge at its base. Shields without spines. *Lateral line and upper caudal edge not continuous.* Tail twice as long as the trunk. *Dorsal fin occupying three body- and five caudal rings.* Caudal fin much longer than pectoral, and as long as the postorbital part of the head.

New Orleans.

a. Female, 8½ inches long. Purchased of Mr. Cuming.

5. Syngnathus schlegelii.

Syngnathus tenuirostris, *Schleg. Faun. Japon. Poiss.* p. 273, pl. 120. fig. 5.
—— schlegelii, *Kaup, Lophobr.* p. 46.

D. 40 (35, Kaup). Osseous rings 19 + 44–46.

Anterior part of the body not deeper than the head. The length of the snout equals the distance of the front margin of the orbit from the root of the pectoral fin. The length of the postorbital part of the head is more than that of two body-rings (measured laterally). No postorbital ridge; anterior part of the operculum with a faint ridge. Shields without spines. *Lateral line and upper caudal edge not continuous.* Tail more than thrice as long as the trunk (without head). Caudal pouch half as long as the tail. Dorsal fin commencing slightly in advance of the vent. Caudal fin well developed.

Japan; China.

a. Adult male. China. Presented by Vice-Admiral Sir E. Belcher.

6. Syngnathus griseolineatus.

Syngnathus griseolineatus, *Ayres, Proc. Calif. Ac. Nat. Sc.* 1854, p. 14; *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 284.
—— californiensis, *Girard, Proc. Ac. Nat. Sc. Philad.* 1856, p. 137; and *U. S. and Pac. R.R. Exp. Fish.* p. 344 (not *Storer*).
—— leptorhynchus, *Girard, l. c.* 1°, 1854, p. 156; and *l. c.* 2°, p. 345; *Gill, l. c.*
—— abboti, *Girard, l. c.* 2°, p. 346.

D. 35–39. Osseous rings 18 + 41.

The length of the snout equals the distance of the front margin of the orbit from the extremity of the pectoral fin. The length of the postorbital part of the head is more than that of two body-rings (measured laterally). No postorbital ridge. Operculum with scarcely a trace of a ridge. Nuchal plates with a more or less distinct median ridge. Shields without spines. *Lateral line and upper caudal edge not continuous.* Tail nearly twice as long as the trunk (without head). Dorsal fin commencing *slightly* in advance of or above the vent. Caudal fin well developed.

California.

a. Adult. California. Presented by Mr. F. Gruber. (D. 35. Rings 18+41.)

b. Adult. Vancouver Island. Collected by Lieut.-Col. Hawkins. (D. 39. Rings 18+41.)

c, d. Adult: dried. Esquimalt Harbour. Collected by the Boundary Commission. (D. 35.)

7. **Syngnathus acicularis.**

Syngnathus acicularis, *Jenyns, Voy. Beagle, Fish.* p. 147, pl. 27. fig. 3.

—— arundinaceus, *Girard, U. S. Pac. R.R. Exped. Fish.* p. 346; *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 283.

Most closely allied to *S. acus, schlegelii,* and *griseo-lineatus.*

D. 36. Osseous rings 18+42.

Anterior part of the trunk deeper than the head. The length of the snout equals the distance of the front margin of the orbit from the root of the pectoral fin, which is half as long as the snout. No postorbital ridge. Operculum with scarcely a trace of a ridge. Nuchal plates with a slight median ridge. Shields without spines. *Lateral line and upper caudal edge not continuous.* Tail twice as long as the trunk. Dorsal fin commencing somewhat in advance of the vent. Caudal fin well developed.

Western coasts of America.

a. Adult female. Coquimbo Bay. Collected by Dr. Cunningham.

8. **Syngnathus fistulatus.**

Peters, Monatsber. Ak. Wiss. Berl. 1868, p. 456.

D. 37. Osseous rings 20+41.

Snout twice as long as the distance of the posterior end of the opercle from the orbit, and but little higher than broad. Supraorbital ridges continued on the crown and convergent. Opercle with a keel on its anterior half, and radiating striæ. The entire head leathery, rough. Shields without spines. *Lateral line passing into the upper caudal edge. Dorsal fin commencing on the anal ring, and occupying seven caudal rings.* Tail twice as long as the trunk (without head). Pouch on twenty-one caudal rings. (*Ptrs.*)

Puerto Cabello.

9. Syngnathus alternans.

D. 39. Osseous rings 20+41.

Snout twice as long as the postorbital part of the head, with a low median ridge above, which simply passes into the suture between the frontal bones. The two nuchal plates with a low median ridge. Supraorbital edge faintly continued on the side of the crown. Operculum with scarcely a trace of a keel near its base, and with fine radiating striæ. Shields without spines. *Lateral line passing into the upper caudal edge. Dorsal fin standing on two body- and nine caudal rings.* Tail twice as long as the trunk; pouch on twenty-three caudal rings. Pectoral and caudal fins well developed. Body and tail with fourteen brown cross bands, which are as broad as, or broader than, the interspaces.

Seychelles.

a. Male, 7½ inches long. From the Haslar Collection.

10. Syngnathus semifasciatus.

Leptonotus semistriatus *, *Kaup, Lophobr.* p. 48.

D. 38. Osseous rings 21+49.

Lateral line interrupted. Adult females have the trunk strongly compressed and rather elevated, its depth being one-fifth of its length. The length of the snout is equal to the distance of the anterior margin of the eye from the middle of the second body-ring. Head with fine striæ, but without ridges. Shields smooth. The length of the body is contained once and one-third in that of the tail. Vent below the end of the anterior third of the dorsal fin. Caudal fin well developed. Upper part of the trunk with numerous very small, light, dark-edged ocelli, the lower part with a narrow brown vertical bar on each ring. A white stripe, edged with black above and below, runs from the lower part of the snout, through the eye, over the gill-cover.

South Australia and Tasmania.

a. Type of the species, female, 9⅓ inches long. South Australia. (Dr. Kaup states that "its origin is not noted," but it is distinctly written on the label.)

b. Female, 8 inches long. Tasmania. Presented by Dr. Milligan.

c. Female, 8 inches long. Australia. Presented by Dr. A. Günther.

11. Syngnathus blainvillianus.

Syngnathus blainvillianus, *Eydoux & Gervais, in Guér. Mag. Zool.* 1837, vii. pl. 17; or *Voy. Favorite, Zool.* p. 79, pl. 32.

Leptonotus blainvillei, *Kaup, Lophobr.* p. 46.

D. 35–37. Osseous rings 20–21+50.

The lateral line passes uninterrupted into the upper edge of the tail. Males and young females have the trunk of nearly the same shape as the majority of Syngnathes, with but a slight dilatation in the middle, but in old females the trunk is much compressed, dilated vertically, so that it assumes the shape of a nearly oval disk, the depth of which is two-fifths of its length. The length of the snout equals the distance of the anterior margin of the eye from the base of the pectoral fin. Head with fine striæ, but without ridges; shields smooth; upper and lower profiles of the trunk of old females cutting. The length of the body is contained from once and one-half to once and two-thirds in that of the tail. Egg-pouch short, attached to eleven rings only. Dorsal fin beginning somewhat in advance of the vent. Caudal fin well developed. Old examples with numerous very small, light, brown-edged ocelli; young examples with broad brown cross bands.

---

* The bands are transverse (*fasciæ*), and not longitudinal (*striæ*).

Coasts of Chile and Peru.

a–i. Adult and young. Chile. From Mr. Bridges's Collection.
k, *l*. Young females. South Sea. Presented by Capt. Lord Byron.

12. Syngnathus affinis.

? Syngnathus fasciatus, *Kaup, Lophobr.* p. 45 (not *Dekay*).

D. 35. Osseous rings 18+33.

The length of the snout is a little less than that of the remaining part of the head. Head nearly one-ninth of the total length. A distinct ridge runs along the median line of the snout and nuchal shields. Supraorbital ridge continued over the temple. Anterior part of the operculum with a faint ridge. Shields without spines. Tail longer than body; caudal pouch half as long as the body. Lateral line interrupted. Vent below the posterior third of the dorsal fin, which occupies nine rings, five of which are body-rings. Caudal fin well developed; anal fin rudimentary in the male. Back with indistinct brown cross bars. A brown band from the eye along the snout.

	in.	lin.
Total length	6	0
Length of head	0	10
Length of trunk	1	9
Length to origin of dorsal fin	2	0

Louisiana.

a. Adult.

13. Syngnathus rousseaui.

Kaup, Lophobr. p. 40.

Osseous rings 16+34.

Each ring is interrupted by a short marginal spine. Snout as long as the remaining portion of the head. Dorsal fin commencing in advance of the vent. Lateral line interrupted. (*Kaup.*)

Martinique.

14. Syngnathus abaster.

Syngnathus acus, *Risso, Ichth. Nice*, p. 63.
—— abaster, *Risso, Eur. Mérid.* iii. p. 182; *Kaup, Lophobr.* p. 39.

D. 33 (Kaup), 37 (Risso). Osseous rings 16+x.

The short snout is surmounted by a leaf-like crest, which is notched near the mouth, and stands higher than the forehead and orbits. A strongly prominent line passes over the nostrils and orbit, and encompasses the hind head. Tail one-half longer than the body. Dorsal fin commencing somewhat in advance of the vent. Ridges of the body and tail prominent; lateral line not interrupted. Males brownish, with minute yellowish dots. (*Kaup.*)

Mediterranean.

15. Syngnathus algeriensis.

Syngnathus algeriensis, *Playfair in litt.*

D. 29. Osseous rings 16+33.

The length of the snout equals the distance of the front margin of the orbit from the root of the pectoral; a low crest runs along its median line. Interorbital space very narrow, concave; supraorbital edge continued into a ridge along the side of the crown. Occipital, nuchal, and body-ridges sharp; operculum with a distinct ridge at its base. Shields smooth; lateral line continuous with the upper caudal edge. Tail one-half longer than body. Dorsal fin commencing opposite to the vent, and standing on six or seven tail-rings. Caudal pouch half as long as the tail. Sides finely and irregularly marbled with black.

Algiers (fresh water).

a, b–e. Adult males (80 millims.) and females (115 millims.). Presented by Lieut.-Col. Playfair.

16. Syngnathus agassizii.

Syngnathus agassizii, *Michahelles, Isis*, 1829, p. 1013.
—— muræna, *Kaup, Lophobr.* p. 40.

D. 26–28. Osseous rings 17+36.

The length of the snout is equal to that of the postorbital portion of the head. Upper part of the crown without ridge; anterior part of the operculum with a faint ridge. Shields smooth. Tail one-half longer than the body; caudal pouch half as long as the tail. Dorsal fin commencing opposite to the vent. Caudal fin well developed. Lateral line not interrupted. Pouch rather longer than the trunk. Brown, marbled with blackish, abdomen with pearl-coloured spots.

Adriatic; north coast of Africa.

a–g. Females, 4–5 inches long. Tripoli. Presented by J. Ritchie, Esq.

h–i. Female and male. From the Collection of the Zoological Society.

17. Syngnathus temminckii.

Syngnathus temminckii, *Kaup, Lophobr.* p. 36.

D. 31. Osseous rings 19 + 37.

The length of the snout is equal to that of the postorbital portion of the head. Head and snout roughly shagreened, and measuring one-ninth of the whole length. Shields smooth. Tail rather longer than the body, caudal pouch about half as long as the tail. Dorsal fin commencing in advance of the vent. Smutty yellowish brown, irregularly speckled. (*Kaup.*)

Cape of Good Hope.—The typical specimens are in the Leyden Museum.

18. Syngnathus dimidiatus.

Syngnathus brevirostris, *Girard, Proc. Ac. Nat. Sc. Phil.* 1854, p. 156, and *U. S. Pac. R.R. Exped. Fish.* p. 345.
—— dimidiatus, *Gill, Proc. Ac. Nat. Sc. Phil.* 1862, p. 284.

D. 30–32. Osseous rings 18 + 37–39.

The length of the snout is equal to that of the remaining portion of the head. The length of the head is one-eighth of the total. Shields smooth. Caudal pouch longer than the trunk. Dorsal fin commencing opposite to the vent. Brownish, with darker spots above, and whitish dots below. (*Girard.*)

San Diego, California.

19. Syngnathus pelagicus.

Syngnathus pelagicus, *Osbeck, Voyage,* ii. p. 113; *L. Syst. Nat.* i. p. 416; *Bl.* tab. 109. fig. 4; *Lacép.* ii. p. 39; *Bl. Schn.* p. 515.
? Syngnathus ethon, *Risso, Eur. Mérid.* iii. p. 182.
Syngnathus elucens, *Poey, Repert. Fis.-nat. Cuba,* ii. p. 443.

D. 29–31. Osseous rings 17 + 32–35.

The length of the snout equals the distance of the front margin of the orbit from the root of the pectoral fin. A distinct ridge along the median line of the nuchal shields; supraorbital ridge not continued over the temple; anterior part of the operculum with a faint ridge. Shields without spines. Lateral line interrupted. Tail longer than the body; caudal pouch short, about half as long as the body. Dorsal fin commencing somewhat in advance of the vent. Caudal well developed. Lower half of the side of the abdomen with vertical silvery bars, becoming broader and of a whitish colour on the upper half. Brown cross bands are placed alternately between the silvery bars, so that the brown bands are grouped together in twos or threes, the bands of each group more or less confluent. In males the silvery bars are represented by spots; a brown band through the eye and along the snout. Dorsal fin with oblique brown bands.

Mediterranean; tropical parts of the Atlantic; Southern Pacific; Mauritius.

a–b. Adult and half-grown. Mediterranean. Purchased of Mr. Argent.

c–d. Adult male and female. Atlantic. Presented by General Hardwicke.

e–f. Adult male and female. Mid Atlantic. Purchased of Mr. Rouse.

g. Adult male and female. West Indies. Presented by Dr. J. E. Gray.

h. Adult female. Cuba. From the Collection of the Zoological Society.

i–k. Adult males. Falkland Islands. Presented by W. E. Wright, Esq.

l–o. Fine specimens. New Zealand. Presented by Mrs. Wormald.

p. Many specimens. South Australia. Presented by Sir G. Grey.

q. Several half-grown and young specimens. China.

r. Fine specimen. Mauritius. Presented by Lady Sale.

s, t, u, v, w, x, y, z, α, β, γ. Many specimens without indication of the locality.

20. **Syngnathus modestus.**

D. 22. Osseous rings 17 + 31.

The length of the head is one-eighth of the total; snout half as long as the head. A distinct median ridge on the nuchal shields; supraciliary edge continued into a short ridge behind. Anterior part of the opercle with a faint ridge. Body deeper than broad; tail twice as long as the trunk; ridges prominent; shields without spines. Caudal pouch half as long as the tail. Dorsal fin commencing on the front suture of the anal ring. Caudal fin well developed. Lower side of the snout with brownish fasciolæ; body without distinct markings.

? New Hebrides; ? South America.

a. Five and a half inches long.—A detached label in MacGillivray's handwriting, with "Aneiteum" marked on it, was found with this example. It is very probable, though not quite certain, that this label belongs to the specimen.

b. Female, 6 inches long.—This example is in a bottle marked "South America," and containing a label with the word "*acus*" in Dr. Kaup's handwriting. Probably the specimen has been placed in a wrong bottle, as is unfortunately so frequently the case with the older examples of Lophobranchiate fishes in this collection.

21. **Syngnathus** (?) **crinitus.**

Syngnathus crinitus, *Jenyns, Zool. Beagle, Fish.* p. 148, pl. 27. fig. 5.

D. ca. 20. Osseous rings 16 + 36.

Head and snout very short, the length of the former being one-eleventh of the total. Snout one-third as long as the head, somewhat bent upwards. Crown of the head keeled; a very small supraciliary filament. Interorbital space concave. Tail not twice as long as the body. Dorsal fin commencing opposite to the vent. Body nearly as broad as deep. Pectoral and caudal fins small. (*Jenyns.*)

Bahia Blanca (Northern Patagonia). 3½ inches long.

22. Syngnathus brevirostris.

Syngnathus brevirostris, *Rüpp. N. W. Fische*, p. 144.
Corythoichthys brevirostris, *Kaup, Lophobr.* p. 28.

D. 19. Osseous rings 14+28.

Head and snout very short, the length of the former being one-tenth or one-eleventh of the total. Snout one-third as long as the head. Head without ridges. Body slightly compressed, with distinct ridges; lateral line passing into the lower caudal edge. Tail one-half longer than the body; pouch two-fifths as long as the tail. Dorsal fin commencing opposite to the vent.

Red Sea.

a. Adult male, 2 inches long. Massaua. Collected by Dr. Rüppell. —One of the typical specimens.

b. *Base of the dorsal fin elevated.*

23. Syngnathus serratus.

? *Russell*, pl. 30. fig. 2.
Syngnathus serratus, *Schleg. Faun. Japon. Poiss.* p. 272, pl. 120. fig. 4; *Bleek. Verh. Bat. Gen.* xxv. *Nalez. Japan*, p. 55.
Trachyrhamphus serratus, *Kaup, Lophobr.* p. 23.
—— cultrirostris, *Peters, Monatsber. Ak. Wiss. Berlin*, 1869, p. 710 (young).—I am indebted to Prof. Peters for an opportunity of examining the typical example.

D. 27. Osseous rings 24–25+47.

Base of the dorsal fin elevated. *Snout less than half as long as the head, with a serrated crest.* Interorbital space broad, with the orbital edges prominent, smooth; occiput and nape with a median ridge; eyes large. Operculum finely radiated. Body scarcely deeper than broad; shields without spines. Tail one-half longer than the body. Vent nearly below the middle of the dorsal fin, which stands on six rings. Caudal fin extremely small. Egg-pouch more than half as long as tail.

China and Japan; Siam.

a, b–g. Adult. North China. Purchased of Mr. Jamrach.
h. Numerous dried examples. China.—Named *S. trachyrhynchus* and *S. chinensis*.
i–k. Adult. Siam. Purchased of Mr. Jamrach.

24. Syngnathus longirostris.

Trachyrhamphus longirostris, *Kaup, Lophobr.* p. 24.

D. 27. Osseous rings 26+54.

Base of the dorsal fin elevated. *Snout more than half as long as* *the head*, with a low rough median ridge. Interorbital space flat, broad, with the orbital edges prominent, smooth; occiput and nape with a median ridge; eyes large. Operculum finely radiated. Body deeper than broad; shields without spines. The length of the body is contained once and two-thirds in that of the tail. Vent below the middle of the dorsal fin, which stands on seven rings. Caudal fin extremely small. Egg-pouch not half as long as the tail.

China.

a. Type of the species, 12 inches long. Presented by Vice-Admiral Sir E. Belcher.

Dr. Kaup states that the British Museum possesses two examples; there is only one now in this collection.

25. Syngnathus intermedius.

Trachyrhamphus intermedius, *Kaup, Lophobr.* p. 24.

Osseous rings 21+x.

The length of the snout equals that of the remaining part of the head. The dorsal fin stands on six rings. (*Kaup.*)

China or Japan.

26. Syngnathus ceylonensis.

D. 26. Osseous rings 24+46.

Base of the dorsal fin elevated. The lateral line is bent downwards, and passes into the *lower* edge of the tail. Snout longer than the remaining part of the head, with a slight ridge above. Interorbital space nearly flat; occiput and nape with a median smooth ridge. Operculum finely radiated. Eye rather large. The length of the head is contained thrice and one-fifth in that of the trunk, the length of the body (with the head) once and one-half in that of the tail. Trunk rather deeper than broad. Vent below the beginning of the second third of the dorsal fin. Caudal fin well developed. Upperside of the tail much narrower than lower. Coloration indistinct.

Ceylon; Zanzibar.

a. Female, $9\frac{1}{2}$ inches long. Ceylon.
b. Female, $6\frac{3}{4}$ inches long. Zanzibar. Presented by Lieut.-Col. Playfair.

27. Syngnathus zanzibarensis.

Günther, in Fish. Zanz. p. 140, pl. 20. fig. 5.

D. 26. Osseous rings 22+59–63.

Base of the dorsal fin elevated. Snout as long as the distance between the anterior margin of the orbit and the extremity of the pectoral fin, without ridge above. Interorbital space rather broad, concave; occiput and nape with a median ridge; eyes of moderate size. Operculum finely radiated. Trunk rather deeper than broad with a slight swelling in the middle. Shields without spines. Body half as long as the tail. Vent below the middle of the dorsal fin, which stands on six rings. Caudal fin rudimental. Egg-pouch extending over eighteen rings.

Zanzibar; China.

a, b. Several adult specimens (types). Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Adult. China. Presented by Vice-Admiral Sir E. Belcher.

B. *Operculum crossed by a ridge in its entire length.*

28. **Syngnathus grayi.**

Halicampus conspicillatus, *Kaup, Lophobr.* p. 22 (not *Jenyns*).
—— grayii, *Kaup, ibid.*
Syngnathus koilomatodon, *Bleek. Act. Soc. Sc. Indo-Neerl.* v. *Japan,* v. p. 10, tab. 1. fig. 1 (young).

D. 20. Osseous rings 18+35.

Base of the dorsal fin elevated. The length of the snout is less than one-half of that of the head; it is provided with series of minute spines; forehead rather high, its profile abruptly descending towards the snout. Occiput and neck elevated into a crest; eyes large, prominent; edge of the orbit rough. Operculum with radiating striæ, and a strong ridge bent upwards; humerus with a trihedral prominence. Body not deeper than broad; shields without spines, but the ventral edges of the caudal rings forming the pouch are horizontally dilated. Tail one-half longer than the body. Vent below the middle of the dorsal fin, which stands on four rings. Caudal fin very small. Egg-pouch at least half as long as the tail. A deep-brown spot on the side of the fourth body-ring.

Japan; Australia?

a. Six inches long: type of the species. (The original label, indicating the locality of this specimen, is lost.)
b. Four inches long: type of *S. koilomatodon.* Nagasaki. From Dr. Bleeker's Collection.

Dr. Kaup has confounded this fish with the common *S. conspicillatus* of Jenyns.

29. **Syngnathus tetrophthalmus.**

Syngnathus andersonii, *Bleek. Nat. Tyds. Ned. Ind.* xv. 1858, p. 465.
—— tetrophthalmus, *Bleek. Nat. Tyds. Ned. Ind.* xv. 1858, p. 467.

D. 20. Osseous rings 16–17+27–28.

Operculum crossed by a faint but distinct ridge*. Head and snout short, the latter turned upwards, and as long as the postorbital part of the head. A ridge along the median line of the nuchal shields. Body scarcely deeper than broad, with the ridges very prominent; shields without spines. Tail twice as long as the trunk (without head). Dorsal fin commencing slightly in advance of the vent. Operculum brown, with a silvery subcentral spot; symmetrical brown markings on the lowerside of the head.

---

* This has been overlooked by Bleeker.

Cocos Island.

a. Type of *S. tetrophthalmus*, 61 millims. long. Nova Selma. From Dr. Bleeker's Collection.

S. andersonii and *tetrophthalmus*, Blkr., are evidently identical. The long description of the one is merely a repetition of that of the other, except with regard to the colours, the specimens named *S. andersonii* having been more brightly coloured than the type of *S. tetrophthalmus*. Dr. Bleeker describes the coloration of the former thus:—"Colore corpore nigricante-violaceo, ventre dilutiore, iride nigricante margaritaceo radiatim striata; capite margaritaceo maculato et variegato; trunco margaritaceo punctulato et ocellato, ocellis lateribus suturis sitis in series 3 longitudinales dispositis, ocellis scutis trunci 2°, 7°, et 12° in vittam transversam unitis; capite, dorso caudaque superne fasciis 11 transversis margaritaceis, fasciis 1^a et 2^a cephalicis, 3^a, 4^a, 5^a, 6^a, et 7^a dorsalibus, posterioribus 4 caudalibus; pinnis dorsali roseo-hyalina, pectoralibus et anali violaceo-hyalinis, caudali nigricante roseo marginata."

30. Syngnathus albirostris.

Corythoichthys albirostris, *Kaup, Lophobr.* p. 25.

D. 24. Osseous rings 19+29.

Operculum crossed by a prominent straight ridge. Snout and head rather short, the length of the latter being nearly one-third of its distance from the vent. Snout as long as the postorbital part of the head, with a strong, interrupted median crest. Occiput and nuchal plates compressed into a strong crest; a pair of longitudinal ridges on each side of the occiput. Body with very prominent ridges, rather deeper than broad. Shields without spines. The length of the trunk (without head) is contained once and two-thirds in that of the tail. Lateral line not continued beyond the trunk. Dorsal fin commencing on the anal ring, and occupying four caudal rings. Caudal fin well developed, longer than pectoral. Body and tail with about twelve irregular broad brown cross bands; the lower part of the head with oblique brown transverse bands. Snout white.

Mexico, Bahia.

a. Female, 6 inches long. Mexico.

I have no doubt Dr. Kaup's statement that the number of body-rings is 12 only is an error.

31. Syngnathus cyanospilus.

Syngnathus cyanospilus, *Bleek. Nat. Tyds. Ned. Ind.* vi. 1854, p. 114.
—— mossambicus, *Peters, Monatsber. Ak. Wiss. Berl.* 1855, p. 465; and *Flussfische v. Mossamb.* p. 104, taf. 20. fig. 3.
—— kuhlii, *Kaup, Lophobr.* p. 34.

D. 20–23. Osseous rings 13–15+33–35.

Operculum crossed by a straight ridge. Snout and head of moderate length, the length of the latter being contained eight times and one-half in the total. Snout not very narrow, its length being less than one-half of that of the head. A low sharp median ridge along the snout, crown, and nuchal shields; another on each side of the head. Body deeper than broad, with prominent ridges. Shields without spines. The length of the trunk is rather less than one-half of that of the tail. Lateral line not continued beyond the trunk. Dorsal fin commencing on the anal ring. Pouch half as long as the tail. Caudal fin short. Body with irregular brown cross bars, each of which has a broad whitish edge behind. Dorsal with black dots.

Zanzibar; Mossambique; East-Indian archipelago.

a. Fine male specimens, 5 inches long. Zanzibar. Presented by Lieut.-Col. Playfair.

b, c–e. Females, 5 inches long. Zanzibar. Presented by Lieut.-Col. Playfair.

f–h. Females. East Indies.

East-Indian examples differ very slightly from East-African; they have the caudal fin a little longer; but the length of this fin varies also in East-African specimens.

32. **Syngnathus margaritifer.**

Peters, Monatsber. Ak. Wiss. Berlin, 1868, p. 457.

D. 21–23. Osseous rings 20 + 35–37.

Operculum crossed by a straight ridge. The length of the snout is somewhat more than one-half of that of the head. A low ridge along the median line of the snout, and of the crown of the head and neck; supraorbital edge continued into a feeble ridge on the side of the crown. Shields without spines. Tail about twice as long as the trunk. *Dorsal fin occupying two body- and four or five tail-rings.* Pouch extending to or beyond the sixteenth tail-ring. Brown, with mother-of-pearl coloured dots.

New South Wales.

a. Male, 5 inches long. Port Jackson. Voyage of the 'Herald.'

33. **Syngnathus penicillus.**

Cantor, Mal. Fish. p. 386.

D. 22. Osseous rings 17 + 35.

Operculum crossed by a straight ridge. The length of the snout is rather more than one-half of that of the head. A low sharp ridge runs along the median line of the snout, crown of the head, and neck; supraorbital edge continued into a ridge on the side of the crown of the head. Shields without spines. Tail twice as long as the trunk. *Dorsal fin commencing a little behind the vent.* Caudal fin very small.

Pinang.

a. Type of the species, $3\frac{6}{8}$ inches long. From Dr. Cantor's Collection.

34. Syngnathus tapeinosoma.

Syngnathus tapeinosoma, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 376.

D. 29. Osseous rings 15+37–38.

Operculum crossed by a straight ridge. The length of the snout is one-half of that of the head. "Vertice rugoso postice linea media leviter bicarinato, carinis glabris; orbitis cristisque utroque latere rostro-oculari et postoculari glabris." Body but little deeper than broad. Shields without spines. Tail (without fin) more than twice as long as the trunk (without head). Dorsal fin commencing at some distance behind the vent (on the third caudal ring). (*Blkr.*)

West Java. One example, 99 millims. long.

35. Syngnathus hunnii.

Syngnathus hunnii, *Bleek. Act. Soc. Sc. Indo-Neerl.* viii. *Sumatra*, viii. p. 70.

Evidently most closely allied to *S. spicifer*.

D. 28. Osseous rings 14+39 or 40.

Operculum crossed by a straight ridge. The length of the snout is much more than that of the postorbital part of the head. Snout, occiput, and upper edge of the orbit with a somewhat rough ridge. Body compressed, much deeper than broad, with the ventral ridge very prominent. Shields without spines. The tail (without caudal) is not quite thrice as long as the trunk (without head). Dorsal fin commencing at some distance behind the vent (on the third caudal ring). Abdomen black, with 13 or 14 narrow pearl-coloured cross bars. (*Blkr.*)

South Sumatra. One example, 140 millims. long.

36. Syngnathus spicifer.

Syngnathus spicifer, *Rüppell, N. W. Fische*, p. 143, pl. 33. fig. 4; *Kaup, Lophobr.* p. 34; *Day, Fish. Malab.* p. 264.
—— djarong, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 22; and *Nat. Tyds. Ned. Ind.* vii. p. 325.
—— gastrotænia, *Bleek. l. c.* 1°, and *l. c.* 2° iii. p. 713.
—— helfrichii, *Bleek. l. c.* 2°, ix. p. 428.
—— argyrostictus, *Kaup, Lophobr.* p. 33.
—— biserialis, *Kaup, Lophobr.* p. 33.

D. 23–27. Osseous rings 16+39–42.

Operculum crossed by a straight ridge. The length of the snout is equal to the distance of the front margin of the orbit from the root of the pectoral in adult examples, but is considerably less in young. A low sharp ridge runs along the median line of the snout, crown of the head, and neck; supraorbital edge continued into a ridge on the side of the crown of the head. Body compressed, much deeper than broad, with the ventral ridge very prominent. Shields without spines. Tail (without caudal fin) twice or thrice as long as the trunk (without head). Dorsal fin commencing behind the vent. Caudal fin small. Abdomen generally with about thirteen black cross bars, at least as broad as the interspaces. Sometimes the species is without these bands, and appears uniform brownish in spirits.

Indian Ocean.

a–d. Half-grown: dried. Zanzibar. From Lieut.-Col. Playfair's Collection (with black cross bands).

e–f. Young. Zanzibar. From Lieut.-Col. Playfair's Collection (without black cross bands).

g. Adult male. Rovuma River. From the Livingstone Expedition. The tail of this individual is only twice as long as the trunk, and composed of 29 rings.

h. Adult male. Mouth of the Zambeze. Presented by Dr. Kirk.

i. Young. Java. From Dr. Bleeker's Collection. One of the types of *S. djarong*; abdomen without cross bands.

k. Adult. Ceram. From Dr. Bleeker's Collection.—Type of *S. gastrotænia*; abdomen with cross bands.

l. Half-grown. Borneo. From Dr. Bleeker's Collection.—Type of *S. helfrichii*; abdomen without cross bands.

m, n. Adult. Luzon. Presented by Prof. Peters.

o. Adult female. China. Presented by Gen. Hardwicke.—Type of *S. biserialis*. (Tail-rings 39 and not 46, as stated by Kaup.)

p. Adult. Purchased of Mr. Jamrach.

Not having received the typical example of *Syngnathus heptagonus*, Blkr. (101 millims. long), I am unable to convince myself of its specific distinctness. Originally described as *Hippichthys heptagonus*, from a single example from Madura (Bleeker, in Verh. Bat. Gen. xxii. Madura, p. 15), it reappears as *Syngnathus pentagonus* (ibid. xxv. Trosk. p. 23), the generic name *Hippichthys* having proved to be useless. There is nothing in the description which would lead me to suppose that it was any thing more than one of the varieties of *S. spicifer*. However, Dr. Kaup, who believes himself to have recognized this species, refers it to his genus *Ichthyocampus*, which has the dorsal ridges coalescent with those of the tail, expressly stating that it differs from *S. spicifer* in this respect (Lophobr. p. 31). On the other hand, Dr. Bleeker, at a later period (Enumer. Spec. p. 187), leaves *S. pentagonus* with *Syngnathus*, although he acknowledges the genus *Ichthyocampus*, thereby implying that it has the dorsal ridges interrupted, and that Dr. Kaup's identification is erroneous. Thus the species remains at present very doubtful, and it can only be determined by a reexamination of the original typical specimen.

Dr. Kaup's *Corythoichthys gastrotænia* (Lophobr. p. 27) is certainly not the *Syngnathus gastrotænia* of Bleeker. It is described as having a snout "one-third the length of the head," the tail, which is not quite the "length of the body, having 40 rings," and as being "found at Wahai and Ceram in the North Pacific" (!).

37. Syngnathus kaupi.

Syngnathus spicifer (part.), *Kaup, Lophobr.* p. 34.
—— kaupi, *Bleek. Natuurk. Verhand. Haarlem,* xviii. *Poiss. Guin.* p. 24, tab. 4. fig. 2 (a coloured figure, but the colours are merely imaginary).

D. 26. Osseous rings 14+34.

Operculum crossed by a straight ridge. The length of the snout equals the distance of the front margin of the eye from the root of the pectoral fin. Crown of the head and nape with ridges. Body deeper than broad. Shields without spines. The length of the trunk (without head) is only two-fifths of that of the tail. Dorsal fin commencing above the vent, and occupying seven rings. Caudal and pectoral fins well developed. Lateral line and upper caudal edge not continuous. (*Blkr.*)

Coast of Guinea.

38. Syngnathus pœcilolæmus.

Peters, Monatsber. Ak. Wiss. Berlin, 1868, p. 458.

D. 28. Osseous rings 20+49.

Operculum with a straight ridge. Snout nearly twice as long as the postorbital part of the head. A low ridge along the median line of the snout and of the crown of the head and neck; supraorbital edge continued into a feeble ridge on the side of the crown. Shields without spines. Tail more than twice as long as the trunk. Dorsal fin occupying the anal and six caudal rings. Lowerside of the head with dark dots; body with very small ocellated dots. (*Ptrs.*)

Adelaide (South Australia).

39. Syngnathus conspicillatus.

Valentyn, fig. 81; *Ruysch, Amboina,* tab. 6. fig. 18; ? *Renard,* i. tab. 4. fig. 30.
Synguathus fasciatus, *Gray, Ind. Zool.* c. fig. (not *Risso*).
? Syngnathus perlatus, *Benn. in Beechey's Voy. Fish.* p. 68, pl. 21. fig. 1.
Syngnathus conspicillatus, *Jenyns, Voy. Beagle, Fish.* p. 147, pl. 27. fig. 4.
—— hæmatopterus, *Bleek. Nat. Tyds. Ned. Ind.* ii. p. 258; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 20.
Corythoichthys fasciatus, *Kaup, Lophobr.* p. 25; *Kner, Novara, Fisch.* p. 391.

D. 29–32. Osseous rings 16–17+34–37.

Operculum crossed by a straight ridge. Snout very thin and slender, the upper profile of the head rising abruptly above the eyes; it is as long as the remaining or the postorbital part of the head. A strong scalloped median ridge on the occiput and nuchal shields; supraorbital ridge continued along each side of the crown. Body but little deeper than broad, with rather strong ridges; shields without spines. Tail more than twice as long as the trunk; caudal pouch flat, not concave, not quite half as long as the tail. Dorsal fin commencing on the anal or first caudal ring. Body and tail with more or less regular reticulated dark-brown cross bands; sometimes large white spots between the bands. Head with fine brown longitudinal lines; a brown longitudinal band from below the eye along the lower side of the operculum. Generally a brownish-black cross bar on the ventral surface of each of the three body-rings.

From the east coast of Africa to the Pacific.

a, b, c. Many adult and half-grown specimens. Zanzibar. From the Collection of Lieut.-Col. Playfair.
d. Adult. Seychelles. From Prof. E. P. Wright's Collection.
e–f. Adult. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
g, h–i. Adult. Amboyna.
k. Several adult and half-grown specimens. Micronesia. Purchased of Mr. Wright.
l–p. Adult. Feejee Islands. Voyage of the 'Herald.'
q–r. Adult. Aneiteum. Collected by Mr. MacGillivray.

40. **Syngnathus martensii.**

Syngnathus martensii, *Peters, Monatsber. Ak. Wiss. Berlin,* 1868, p. 459.

D. 33. Osseous rings 17 + 33.

Operculum crossed by a straight ridge. Snout half as long as the head. A median keel along the median line of the snout, and continued to the occiput. Supraorbital edge not continued on the sides of the crown. Body but little higher than broad. Tail not quite twice as long as the trunk. Dorsal fin occupying two body- and five tail-rings. Dorsal fin with black dots. (*Ptrs.*)

Pulo Matjan (Borneo), in fresh water.

41. **Syngnathus flavescens.**

Kaup, Lophobr. p. 35.

D. 37. Osseous rings 15 + 37.

Operculum crossed by a ridge. Snout half the length of the head, with a median crest. Dorsal fin standing on eleven rings, three of which belong to the body. Tail one-half longer than the body (with the head). (*Kaup.*)

Tripoli.

42. **Syngnathus retzii.**

Syngnathus retzii, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado,* p. 76.

D. 38–40. Osseous rings 17 + 29–30.

Operculum crossed by two sharp divergent ridges. The length of the snout is equal to that of the postorbital part of the head. A low ridge runs along the median line of the snout, crown, and nuchal shields; supraorbital edge continued into a ridge on the side of the crown of the head. Body scarcely deeper than broad, with very prominent ridges. Shields without spines. Tail not twice as long as the trunk (without head). Dorsal fin commencing somewhat in advance of the vent.

Celebes.

a–b. Two of the typical specimens, 65 millims. long. Manado. From Dr. Bleeker's Collection.

43. Syngnathus bicoarctatus.

Syngnathus bicoarctatus, *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboyna*, viii. p. 99.

D. 30. Osseous rings 22 + 60.

Operculum with a ridge obliquely ascending backwards. The length of the head is about one-twelfth of the total. Snout not twice as long as the postorbital part of the head: "occipite prominente angulato, rugoso, non carinato; fronte plane rugosa; orbitis, cristisque utroque latere rostro-oculari et postoculari lævibus." Shields without spines. Tail more than twice as long as the body. Dorsal fin standing on six rings, three of which belong to the body. Caudal fin very small. (*Blkr.*)

Amboyna.

44. Syngnathus budi.

Syngnathus budi, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manad.* p. 77.

D. 52–53. Osseous rings 17–18 + 33.

Operculum crossed by a faint straight ridge. The length of the snout is equal to that of the postorbital part of the head. A low ridge runs along the median line of the snout and nuchal plates; a very faint ridge on each side of the crown. Body very low, worm-shaped; shields without spines. Tail twice as long as the trunk (without head). Dorsal fin commencing considerably in advance of the vent. Caudal fin well developed.

Celebes, Batavia.

a. One of the typical specimens. From Dr. Bleeker's Collection.

3. ICHTHYOCAMPUS.

Ichthyocampus, *Kaup, Lophobr.* p. 29.

The dorsal edges of the trunk and tail are continuous, but sometimes very indistinct. Pectoral and caudal fins present. Dorsal fin opposite or near to the vent. Males with an egg-pouch on the tail, the eggs being covered by cutaneous folds.

Indian and Australian Seas.

1. Ichthyocampus carce.

Syngnathus carce, *Ham. Buch. Fish. Gang.* p. 13; *Gray, Ill. Ind. Zool.* c. fig.; *Bleek. Verh. Bat. Gen.* xxv. *Beng.* p. 161.

Ichthyocampus ponticerianus, *Kaup, Lophobr.* p. 31 (not synon.); *Day, Fish. Malabar,* p. 263.

D. 23–26. Osseous rings 15–16+38–40.

Operculum crossed by a strong straight ridge; head and neck above with a median and lateral ridge. Snout as long as the postorbital part of the head. Body compressed, much deeper than broad, with strong ridges. Tail more than twice as long as the trunk. Dorsal fin commencing on the second caudal ring.

Bengal; Assam; Malabar.

a. Adult. River Hooghly. From Dr. Bleeker's Collection.
b–c. These two examples are probably the "pair from Assam, sent by Mr. Walker, and deposited in the Berlin Museum." They, with many others, were lent to Dr. Kaup, but the labels became detached during their return. "Berlin" Museum evidently stands for "British" Museum.

Dr. Kaup also describes an *Ichthyocampus carce* (Lophobr. p. 30); but this is not the species from the continent of India, having the dorsal fin (D. 20) commencing from the anal ring. It is said to be from Java; but Bleeker has not recognized it, at present, from this island.

2. Ichthyocampus belcheri.

Ichthyocampus belcheri, *Kaup, Lophobr.* p. 30.

D. 22. Osseous rings 16+28.

Operculum without ridge; head and neck above with a faint median and lateral ridge. Head and snout very short, the latter as long as the postorbital part of the head. Body scarcely deeper than broad, with obtuse ridges. Tail not quite twice as long as the trunk; caudal pouch not quite half as long as the tail, lined with a stiff fold, in which the division into rings is preserved. Origin of the dorsal fin on the second caudal ring. Caudal fin very short.

China.

a–b. Types of the species, 3½ inches long. Presented by Vice-Admiral Sir E. Belcher.

3. Ichthyocampus scalaris.

D. 25. Osseous rings 19+39.

Operculum without ridge. The length of the head is about one-ninth of the total; snout half as long as the head in adult examples, and as long as the postorbital portion in young. Upper part of the head with scarcely a trace of a ridge along the nuchal shields. Body as deep as broad, with very obtuse ridges. Tail twice as long as the trunk. Dorsal fin standing on seven rings, three of which belong to the body. Caudal fin very short. Body and tail with from 13 to 15 irregular broad brown cross bands, more distinct in young than in adult examples. A narrow brown cross bar on the suture between every two ventral shields. Lower side of the head and breast with deep brown dots.

Australia.

a–e. Adult (7 inches long), half-grown, and young. Freycinet's Harbour. Voyage of the 'Herald.'

4. Ichthyocampus filum.

D. 14. Osseous rings 16+47–48.

Head and snout very short, the length of the former being two-fifths of its distance from the vent. Snout turned upwards, one-third of the length of the head. Head and body compressed, without ridges. The length of the body (with the head) is contained twice and two-thirds in that of the tail; pouch as long as the trunk, lined with soft membrane. Vent opposite to the middle of the dorsal fin. Pectoral fin short and narrow, caudal fin well developed. Narrow brownish-black cross bars, corresponding to the sutures between the body-rings.

New Zealand; Australia.

a–c. Male and females, 4 inches long. Bay of Islands. Presented by Sir G. Grey.

d–e. Males. Freycinet's Harbour.

4. NANNOCAMPUS.

Body with obsolete ridges, the dorsal edges of the trunk and tail being continuous. Pectoral fin none; caudal rudimentary; dorsal fin short, opposite to the vent. Male with the egg-pouch on the tail, formed by the dilated lower edges.

Australia.

1. Nannocampus subosseus.

D. ca. 10. Osseous rings 16+35.

Head and snout extremely short, the length of the former being contained twice and two-thirds in its distance from the vent. Snout not longer than deep, about two-sevenths of the length of the head. The bones on the lower side of the head remarkably well ossified, this side being as broad and convex as the upper. The entire head finely granulated, without ridges. Body-ridges obsolete; body slightly compressed. The length of the body (with the head) is one-half of that of the tail; pouch as long as the trunk, formed by the dilated lower caudal edges. Vent opposite to the fore part of the dorsal fin. Caudal fin very small. Brown, finely marbled with darker and lighter; body and tail with some narrow, irregular bluish cross bands.

Freycinet's Harbour.

a. Male, dried, 90 millims. long. Voyage of the 'Herald.'

5. UROCAMPUS.

Body elongate, compressed, with distinct longitudinal ridges; the upper edge of the trunk continuous with that of the tail; lateral line continuous with lower caudal edge. Tail elongate, quadrangular, tapering. Pectoral and caudal fins developed; the dorsal is placed entirely on the tail, at a great distance behind the vent.

Manchuria.

1. Urocampus nanus.

D. 15. Osseous rings 11 + 50.

Snout as long as the remaining part of the head, scarcely lower than the forehead; the supraorbital edges converge in front to form the median ridge of the snout. Occiput and nuchal shields with a slight ridge; operculum smooth and thin. The length of the head is contained twice and two-thirds in its distance from the vent. Osseous rings of the body thin, smooth, flexible, with the ridges well developed, without spines. Tail tapering, very thin, twice as long as the body. Dorsal fin occupying from the ninth to the twelfth tail-rings; pectoral and caudal fins very small; anal none.

Manchuria.

a. Female, 96 millims. long. Presented by A. Adams, Esq.

6. DORYICHTHYS [*].

Doryrhamphus, Chœroichthys, Doryichthys, et Microphis, *Kaup*.
Belonichthys, *Peters*.

Body with the ridges well developed. Pectoral and caudal fins present. Dorsal fin long or of moderate length, opposite to the vent. Humeral bones firmly united. Males with the lower edges of the abdomen dilated, the dilated parts forming a broad groove for the reception of the ova.

Tropical seas; some species living in fresh water.

The species may be arranged thus:—

- A. Lateral line interrupted.
  - *a*. Dorsal fin with more than 60 rays, p. 180.
  - *b*. Dorsal fin with less than 60 rays, p. 180.
- B. Lateral line passing into the lower edge of the tail.
  - *a*. Dorsal fin with more than 60 rays, p. 181.
  - *b*. Dorsal fin with less than 60 rays.
    - α. Tail longer than body, p. 181.
    - β. Body longer than tail, p. 182.

---

[*] 1. Doryichthys pristipeltis, *Kaup*, *Lophobr*. p. 58.—Hab. —?
2. Syngnathus deocata, *Ham. Buch. Fish. Gang.* p. 14; *Gray, Ind. Zool.* c. fig.—Rivers of Northern Bengal and Behar.
3. Microphis jagorii, *Peters, Monatsber. Ak. Wiss. Berlin*, 1868, p. 280.—Samar.—D. 37. Oss. rings 21 + 25.

A. *Lateral line interrupted.*

a. *Dorsal fin with more than sixty rays.*

1. Doryichthys heterosoma.

Syngnathus heterosoma, *Bleek. Nat. Tyds. Ned. Ind.* ii. p. 440; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 15.

D. 65–68. Osseous rings 26+31–38.

The edge of each ring terminating in a spine. Lateral line interrupted. Operculum with a longitudinal ridge. Snout more than twice as long as the remaining part of the head. Vent below the second third of the base of the dorsal fin, behind the middle of the total length.

Borneo.

a. Male, one of the typical examples. From Dr. Bleeker's Collection.

b. Adult female. Received from Dr. Bleeker with the erroneous name of *Microphis boaja.*

b. *Dorsal fin with less than sixty rays.*

2. Doryichthys boaja.

Syngnathus boaja, *Bleek. Nat. Tyds. Ned. Ind.* i. p. 16; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 14.
Doryichthys spinosus, *Kaup, Lophobr.* p. 57.

D. 49–50. Osseous rings 24+33–38.

The edge of each ring terminating in a spine. Lateral line interrupted. Operculum with a longitudinal ridge. Snout not twice as long as the remaining part of the head. Vent below the end of the anterior fourth of the dorsal fin, behind the middle of the total length.

Sumatra; Siam; Borneo; China.

a. Adult. Sumatra.
b. Half-grown. Siam. From Mouhot's Collection.
c. Adult. Borneo.
d. Adult. China. Presented by Sir J. Richardson.

3. Doryichthys deokhatoides.

Syngnathus deokhatoides, *Bleek. Ver. Bat. Gen.* xxv. *Trosk.* p. 17; or *Nat. Tyds. Ned. Ind.* vii. p. 106.

D. 33–37. Osseous rings 20–22+31–35.

Edges of the shields rough, without spines. Lateral line interrupted. Operculum with a longitudinal ridge. Length of the snout equal to the distance of the anterior margin of the eye from the end of the pectoral fin. Origin of the dorsal fin slightly in advance of the vent, which is a little nearer to the end of the snout than to that of the caudal fin.

Sumatra and Borneo.

a. One of the typical specimens. From Dr. Bleeker's Collection.
b. Adult, male. Sarawak. Presented by the Marquis Doria.

4. Doryichthys bilineatus.

Doryichthys bilineatus, *Kaup, Lophobr.* p. 56.

D. 33. Osseous rings 17 + 25.

Edges of the shields not distinctly toothed. Lateral line interrupted. On both sides of the median line the halves of the operculum are striped and scarred. Length of the snout equal to the distance of the front margin of the orbit from the extremity of the pectoral fin. Dorsal standing on six tail-rings. Tail shorter than the body. (*Kaup.*)

Hab ——? The typical specimen is in the Vienna Collection.

B. *Lateral line passing into the lower edge of the tail.*

a. *Dorsal fin with more than sixty rays.*

5. Doryichthys mento.

Syngnathus fluviatilis, *Peters, Monatsber. Ak. Wiss. Berl.* 1852, p. 685 (not *Kuhl & v. Hass.*).
—— zambezensis, *Peters, l. c.* 1855, p. 465.
—— mento, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado*, p. 75.
Belonichthys (Syngnathus) zambezensis, *Peters, Mossamb. Flussfische*, p. 109, taf. 20. fig. 5.

D. 66–74. Osseous rings 19–20 + 18–26.

Shields without spines. Lateral line continuous with the lower caudal edge. Snout nearly as long as the postorbital part of the head; a ridge runs along the median line of the snout, crown, and nuchal plates; a low ridge along each side of the crown. Operculum with a very feeble ridge. Body rather compressed, deeper than broad, with the ridges well developed. Tail sometimes rather longer, sometimes shorter than the body. Dorsal fin standing on fourteen or sixteen rings, ten or twelve of which belong to the body. Caudal fin well developed.

Fresh waters of Celebes and Eastern Africa.

a. One of the typical specimens of *S. mento*. Manado. From Dr. Bleeker's Collection.

After having compared Prof. Peters's detailed description with an example of *S. mento*, I have convinced myself that the Celebes and East-African specimens belong to the same species.

b. *Dorsal fin with less than sixty rays.*

α. Tail longer than body.

6. Doryichthys cuncalus.

Syngnathus cuncalus, *Ham. Buch. Fish. Gang.* p. 12.
Microphis cuncalus, *Kaup, Lophobr.* p. 64.

D. 50. Osseous rings 17–18 + 25–27.

Edges of the shields without spines. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum with a distinct longitudinal ridge. Snout somewhat turned upwards. Dorsal fin standing on ten rings, three of which belong to the trunk. Tail rather longer than the body. Back with dark cross bands down to the lateral line; tail with dark rings.

Mouth of the Ganges; Malabar.

a–b. Females. Bengal. From the Collection of the East-India Company.

Kaup (*l. c.*) has already shown that the fish described by Bleeker (Verh. Bat. Gen. xxv. Beng. p. 162, tab. 3. fig. 3) is not the species named by Buchanan. He appears to have had a fish more nearly allied to *D. brachyurus*.

7. **Doryichthys caudatus.**

Microphis caudatus, *Peters*, *Monatsber. Ak. Wiss. Berlin*, 1868, p. 276.

D. 34–38. Osseous rings 17 + 29–30.

No spines. Lateral line passing into the lower edge of the tail. Operculum rough, with one, sometimes double, longitudinal keel; another keel near its upper edge. Snout as long or nearly as long as the postorbital part of the head. Dorsal fin commencing somewhat in advance of the vent on eight or nine rings. Tail conspicuously longer than body. (*Ptrs.*)

Island of Samar, in fresh water; Java.

β. Body longer than tail.

8. **Doryichthys bleekeri.**

Microphis bleekeri, *Day*, *Fish. Malabar*, p. 265.

D. 41–45. Osseous rings 21 + 22.

No spines. Lateral line passing into the lower edge of the tail. Operculum with a distinct longitudinal ridge, and five radiating lines below. Snout about as long as the distance between the fore border of the orbit and the extremity of the first breast-ring. Dorsal fin standing on nine rings, the first of which is the anal ring. Body longer than the tail. (*Day.*)

Malabar.

9. **Doryichthys auronitens.**

Doryichthys auronitens, *Kaup*, *Lophobr.* p. 59.

D. 41–42. Osseous rings 20 + 23.

Edges of the body finely toothed. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum with a distinct longitudinal ridge, and two radiating lines below. Snout longer than the distance between the fore border of the orbit and the extremity of the first breast-ring. Dorsal fin standing on nine rings, two of which belong to the trunk. Length of the tail equal to the distance between the vent and the front of the orbit. (*Kaup.*)

Macassar. The typical specimen is in the Leyden Museum.

Doryichthys bernsteinii, Bleek. Arch. Néerland. Baumhauer, 1867, p. 398, appears to be closely allied to *D. auronitens*. As the journal in which the description has been published is not generally accessible, I give Dr. Bleeker's description :—

"Corpore valde elongato, antice heptagono, postice tetragono, altitudine 24 circiter in ejus longitudine, æque lato circiter ac alto; capite 7 circiter in longitudine corporis; oculis diametro 7 circ. in longitudine capitis; linea rostro-frontali ante oculos concava; rostro capitis parte postoculari duplo circiter longiore, subcylindrico, quintuplo circ. longiore quam parte gracillima, alto, superne crista transversa nulla; vertice convexiusculo celluloso; orbitis lævibus; cristis utroque latere rostro-oculari postocularique et cristulis rostro et vertice medianis leviter vix conspicue crenulatis; operculo celluloso medio crista longitudinali lævi inferne striis aliquot humilioribus divergentibus; scutis trunco 22, cauda 24 vel 25, scutis singulis transversim striatis, laminis intersuturalibus ovalibus lævibus, carinis sublævibus non serratis; carina trunco laterali cum carina caudæ inferiore continua, carina trunco dorsali longe post initium carinæ caudæ superioris producta; cauda absque pinna, trunco absque capite paulo tantum breviore, pinna dorsali conspicue ante anum acuto trunci 20° incipiente et scuto caudali 7° desinente corpore multo humiliore; anali minima; caudali obtuse rotundata capitis parte postoculari non longiore; colore corpore violascente-viridi; iride viridi-aurea; fascia rostro-oculo-caudali profunde fusca; pinnis, caudali fusca, ceteris aurantiaco- vel roseo-hyalinis. D. 41."

A single female specimen, 212 millims. long, from Halmaheira.

10. Doryichthys millepunctatus.

Doryichthys millepunctatus, *Kaup, Lophobr.* p. 60.

Osseous rings 21+x.

Edges of the shields serrated. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum with a distinct longitudinal ridge, and with from three to seven radiating lines underneath. Length of the snout equal to the distance between the anterior margin of the orbit and the further extremity of the ring that supports the pectoral fin. Dorsal fin standing on nine rings, two of which belong to the trunk. Tail shorter than the body. Whitish, dotted with black on the belly. (*Kaup.*)

Madagascar; Bourbon.

The typical specimens are in the Paris Museum.

11. Doryichthys lineatus.

Doryichthys lineatus, *Kaup, Lophobr.* p. 59.
—— aculeatus, *Kaup, Lophobr.* p. 61.

D. 42–44. Osseous rings 19–22+23–27.

Edges of the shields rough, with prominent spines in younger individuals, but they disappear in the adult. Lateral line uninterrupted, passing into the lower edge of the tail. Body compressed.

Operculum with a distinct longitudinal ridge, and a few faint radiating lines beneath. Snout three-fifths as long as the entire head. The length of the head is a little less than one-fifth of the total. Origin of the dorsal fin considerably in advance of the vent, the three anterior rings of its base belonging to the trunk. Vent nearer to the end of the tail than to the gill-opening. Snout with five or six black cross bars beneath.

Tropical parts of the Atlantic.

a. Male, $7\frac{1}{2}$ inches long. Antilles. Purchased of Hr. Brandt.
b. Young. Caribbean Sea. From the Collection of the Zoological Society.
c. Male, $4\frac{1}{2}$ inches long. Old Calabar. Presented by Dr. J. A. Smith.
d. Fine female specimen, 7 inches long. Gaboon. Purchased.
e–f. Females, $4\frac{2}{3}$ inches long. Egypt (??). Presented by Dr. J. E. Gray.—Types of *D. aculeatus.*

12. Doryichthys brachyurus.

Syngnathus brachyurus, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 16, and *Nat. Tyds. Ned. Ind.* vii. p. 105.
—— polyacanthus, *Bleek. Act. Soc. Sc. Indo-Neerl. Manado,* p. 77 (young).
Doryichthys hasseltii, *Kaup, Lophobr.* p. 57.

D. 36–37. Osseous rings 21–23 + 19–24.

The edges of each ring terminate in spines, which are very distinct and prominent in young examples, but become obsolete with age. Lateral line passing uninterrupted into the lower edge of the tail. Operculum with a longitudinal ridge, and three or four other radiating striæ on its lower half. Snout not twice as long as the remaining part of the head. Vent below, or somewhat behind, the origin of the dorsal fin, nearer to the end of the tail than to the gill-opening.

East-Indian archipelago; Pacific.

a. Adult, one of the typical examples. East-Indian archipelago. From Dr. Bleeker's Collection.
b. Young, type of *S. polyacanthus.* Manado. From Dr. Bleeker's Collection.
c. Many fine adult and half-grown examples. Polynesia. Purchased of Mr. Wright.
d–e. Adult male and female ($6\frac{1}{2}$ inches). Aneiteum. Purchased of Mr. Cuming.

13. Doryichthys manadensis.

Syngnathus manadensis, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado,* p. 78.

D. ca. 33. Osseous rings 22 + 25.

Edges of the shields rough. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum with several strong radiating ridges. Length of the snout equal to the distance of the front margin of the orbit from the root of the pectoral fin (in young examples). Origin of the dorsal in advance of the vent, which is midway between the root of the caudal and the gill-opening.

Celebes. Known from young specimens only.

a. One of the typical specimens, 2¾ inches long. Manado. From Dr. Bleeker's Collection.

14. **Doryichthys pleurostictus.**

Microphis pleurostictus, *Peters, Monatsber. Ak. Wiss. Berlin*, 1868, p. 278.

D. 30–32. Osseous rings 18–19 + 23–24.

Edges of the shields smooth. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum without or with a very indistinct ridge. Snout half as long as the head. Origin of the dorsal fin in advance of the vent, which is somewhat nearer to the gill-opening than to the root of the caudal. Caudal fin well developed. A brown band along the side of the head through the eye.

Fresh waters of Luzon.

a–e. Adult (90 millims.) and half-grown. Presented by Prof. Peters.

15. **Doryichthys dumerilii.**

Doryichthys dumerilii, *Kaup, Lophobr.* p. 60.

D. 34. Osseous rings 18 + 24.

Edges of the body distinctly toothed, with a long spine on the end of each ring. Lateral line uninterrupted, passing into the lower edge of the tail. Operculum with a distinct longitudinal ridge, and three radiating lines underneath. Length of the snout equal to the distance between the anterior margin of the orbit and the root of the pectoral fin. Dorsal fin standing on eight rings, two of which belong to the body. Length of the tail equal to the distance between the vent and the middle of the snout. (*Kaup.*)

Hab. ——? The typical specimen is in the Paris Museum.

16. **Doryichthys sculptus.**

D. ca. 30. Ossoous rings 20 + 24.

This species is comparatively much shorter than its congeners. The edges of each ring are prominently spinous behind. Lateral line uninterrupted, passing into the lower edge of the tail. Snout not quite half as long as the head, slightly turned upwards; head half as long as the trunk. Operculum with numerous prominent radiating ridges. The depth of the body is at least equal to the length of the postorbital portion of the head. Vent behind the middle of the dorsal fin, which stands on seven rings, five belonging to the trunk. Vent midway between the end of the gill-cover and the root of the caudal, which is very short. There are five distant pairs of yellow spots on the back; in the male the lateral line is accompanied by two series of yellow dots.

Feejee Islands.

a–b. Male and female, $2\frac{1}{4}$ inches long. Voyage of the 'Herald.'

These specimens appear to be adult.

17. **Doryichthys dactylophorus.**

Syngnathus dactyliophorus, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 16, or *Nat. Tyds. Ned. Ind.* iv. p. 506.

D. 26. Osseous rings 18 + 21.

The edges of each ring terminate in a prominent spine. Lateral line uninterrupted, passing into the lower caudal edge. Operculum with an oblique raised line, granulated. Snout not quite twice as long as the remaining part of the head. Vent below the origin of the dorsal fin, nearer to the end of the tail than to the gill-opening. Caudal fin unusually long. Head and body encircled by brown rings, sometimes edged with white.

Java; Amboyna.

a. One of the typical specimens. From Dr. Bleeker's Collection.
b. Adult.
c. Half-grown. Purchased of Mr. Frank.

18. **Doryichthys californiensis.**

Doryrhamphus californiensis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 284.

D. 25. Osseous rings 20 + 16.

The snout forms half the length of the head; its crest is composed of about ten irregular teeth, and further back are two others. The double frontal crest is well dentated. The superior orbital border has five or six teeth. The ridge under the orbit is unarmed, but on the side of the snout it is well serrated. The chin is prominent but unarmed; and some distance behind, in the middle, is a slight swelling. The longest superior pectoral rays are about equal to the length of the operculum. The caudal is as long as the snout. The colour is an almost uniform yellowish brown, but with a black streak from the snout to the upper axilla of the pectoral fin. (*Gill.*)

Cape St. Lucas.

19. **Doryichthys excisus.**

Doryrhamphus excisus, *Kaup, Lophobr.* p. 54, tab. 3. fig. 5 (head).

D. 20. Osseous rings 16 + 14.

All the angles of the body serrated. Measured from the fore border of the orbit, the snout is as long as the distance between the hinder edge of the orbit and the extremity of the gill-cover. Next the nostril there are three coalescent spines, and there are six standing close together on the end of the snout. A row of short spines runs from the under edge of the orbit; and a row extends from behind the orbit to above the tubular nostril. The occiput is finely shagreened and is keeled on its extremity. There are also sundry short prominent lines near the operculum. The operculum itself is divided into very unequal parts by a keel, the upper part being the smallest. With the median keel of the operculum three or four prominent lines are connected. Near the pectoral fin there is a keel on the breast-ring; and the fin, which is unusually large, contains twenty rays. The back is narrow; and there is a furrow above the breast-ring, in which there lies a short keel that issues from the occipital one and ends above the gill-opening. The colour is brownish yellow, with a blackish-brown streak along the side of the snout, through the eye and along the back; the lateral line and the tail are all blackish brown; while the yellowish caudal is spotted with black. A smaller and younger female specimen is heptangular, with a black belly, and the spines of the back and snout are not so fully developed. (*Kaup.*)

Red Sea. Two and a half inches long.

20. Doryichthys valenciennii.

Chœroichthys valencienni, *Kaup, Lophobr.* p. 55, taf. 3. fig. 6.

D. 22. Osseous rings 15+18.

Back concave, with toothed edges. The slender snout measured from the nostrils equals the head in length, and is furnished with a crest. A prominent line runs from the hind head over the eyes to the end of the snout; another descends from the nostrils down to the under border of the orbit, and goes on also to the end of the snout; and there are a third and a fourth on the under borders of the snout. Occiput rough and, like the nuchal shield and dorsal surface of the breast-ring, keeled. A keel divides the operculum into two dissimilar parts. In the upper portion there is an oblique prominent line, and in the under portion there are seven rough cross lines. The dorsal stands on four body-rings and one caudal ring. The ventral aspect of the breast-ring is keeled, and near the pectoral fin there are two elevated lines. Colour smutty dark brown, with a black caudal having a light border, and rays yellow and speckled. There are traces of cross bars on the tail. The length of the specimen is 1·85 inch, of the head 0·39 inch, of the snout 0·20 inch, of the dorsal fin 0·20 inch, of the tail 0·69 inch, and of the caudal fin 0·04 inch. The height of the body is 0·20 inch, and its breadth on the lateral lines is 0·14 inch. (*Kaup.*)

Bourbon.

I insert here the description of a fish known from a single female in the Paris Museum, which I have not seen:—

Leptoichthys fistularius.

Kaup, Lophobr. p. 51.

Snout very long, thin, and much compressed, extended in the same plane with the finely shagreened head. Body unusually elongated, hexagonal, with flat back and belly without intermediate scales. All the fins are much developed, especially the caudal one. The gill-opening is a longer slit than usual. Head oval, occipital shield small, and a furrow commencing at the orbit accompanies the rostral crest. Up to the anus there are twenty-seven body-rings, twenty-four of them before the dorsal, which stands on nine rings, three of them belonging to the body. The tail is four-cornered, higher than it is broad, and composed of twenty-four long rings. Colour yellowish brown, with a black cross band on each ring; ventral piece of the pectoral ring and the gill-cover silvery.

Entire length 22 inches. Length of snout 1·97 inch, of head and snout 2·76 inch, of dorsal fin 1·97 inch, of tail 9·46 inches. The middle ray of the caudal, though it is assuredly not entire, is ·091 inch long. (*Kaup.*)

King George's Sound.

7. CŒLONOTUS.

Cœlonotus, *Peters, Monatsbr. Ak. Wiss. Berlin*, 1855, p. 465.
Hemithylacus, *Kaup, Lophobr.* p. 61.

Only the dorsal ridges are developed, the remainder of the body and tail being smooth and rounded. Pectoral and caudal fins developed; dorsal long, opposite to the vent. Males with the egg-pouch on the abdomen.

Indian Ocean, one species entering fresh waters.

It appears from Kaup's observation, who examined male specimens, that Prof. Peters was mistaken in supposing that the eggs of these fishes are attached to the tail. They agree in this respect with *Nerophis*, which genus offers sufficient proof that the length of the tail is not indicative of the mode of gestation of the ova as Prof. Peters believes (Flussfische von Mossamb. p. 106).

1. **Cœlonotus liaspis.**

Syngnathus leiaspis, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 20.
Hemithylacus leiaspis, *Kaup, Lophobr.* p. 61.

D. 53–55. Osseous rings 17 + 32 (25).

The length of the head is contained thrice and a half in that of the trunk. The length of the snout is equal to that of the post-orbital portion of the head. Head without ridges; body much compressed, deeper than broad, only the dorsal ridges being prominent. Tail longer than the body. Dorsal fin standing on twelve rings, four of which belong to the body. Caudal fin rather small.

Java.

a. One of the typical specimens. From Dr. Bleeker's Collection.

2. **Cœlonotus biocellatus.**

D. 48. Osseous rings 17 + 39.

The length of the head is contained twice and two-thirds in that of the trunk; snout as long as the postorbital part of the head. Head with very slight ridges above; body slightly compressed, deeper than broad, only the dorsal ridges being somewhat prominent. Operculum without keel. The length of the trunk (without head) is only two-fifths of that of the tail. Dorsal fin standing on thirteen rings, four of which belong to the body. Pectoral and caudal fins well developed. Two series of small round, black ocelli along the side of the trunk.

? East-Indian archipelago.

a. Female, 130 millims. long. From the Collection of Dr. van Lidth de Jeude.

Although I have not observed the presence of ova on the trunk in this species, I cannot doubt its pertinence to *Cœlonotus*, as it is very closely allied to *H. liaspis*. In both the operculum is crossed by a series of pores.

3. Cœlonotus argulus.

Syngnathus argus, *Peters, Monatsber. Ak. Wiss. Berlin*, 1852, p. 685 (not *Richards.*).

Cœlonotus argulus, *Peters, l. c.* 1855, p. 465, and *Flussfische v. Mossamb.* p. 106, taf. 20. fig. 4.

Evidently most closely allied to *C. biocellatus*.

D. 42. Osseous rings 17+38–39.

The length of the head is contained twice and two-thirds in that of the trunk; the length of the snout is one-third of that of the head. Head with very slight ridges above; body slightly compressed, deeper than broad, only the dorsal ridges being somewhat prominent. Operculum crossed by a feeble keel for two-thirds of its length. The length of the trunk is only two-fifths of that of the tail. Dorsal fin standing on eleven rings, three of which belong to the body. Pectoral and caudal fins well developed. Two series of small round black ocelli along the side of the trunk. (*Ptrs.*)

Streams of St. Johanna.

Dr. Kaup, in notes to *Hemithylacus liaspis*, mentions examples from Madagascar in the Paris Museum; it is a question whether they really belong to that species or, perhaps, to the present.

8. STIGMATOPHORA.

Stigmatophora, *Kaup, Lophobr.* p. 52.

Body depressed, with the ridges obsolete, those of the trunk being continuous with those of the tail; shields covered with soft skin. Pectoral fin developed, caudal absent, the tail tapering to a very fine point. Dorsal very long. Males with a caudal pouch formed by cutaneous folds.

Australia.

1. Stigmatophora argus.

Syngnathus argus, *Richardson**, *Proc. Zool. Soc.* 1840, p. 29, and *Trans. Zool. Soc.* iii. p. 183, tab. 7. fig. 2.

---

* Dr. Kaup refers to the 'Voyage of the Erebus and Terror;' but I do not find this name in that work.

Stigmatophora argus, *Kaup, Lophobr.* p. 53.

D. 49–52. Osseous rings 20 + ca. 75.

Snout very long, about twice as long as the remaining part of the head. Operculum with a slight ridge in young examples, nearly entirely disappearing in old. Vent below the middle of the dorsal fin. Tail more than twice as long as the trunk; egg-pouch shorter than the trunk. Upper parts with numerous small black white-edged ocelli, sometimes irregularly arranged, sometimes forming longitudinal or transverse series.

Australia.

a. Adult female, type of the species. Australia. From the Haslar Collection.
b. Adult male. Australia. Purchased of Mr. Bowerbank.
c–d. Adult females. Tasmania. Presented by Dr. Milligan.
e–l. Adult and half-grown. Port Jackson. Voyage of the 'Herald.'
m. Adult female. New Guinea. Presented by Mrs. Stanley.

2. Stigmatophora nigra.

Stigmatophora nigra, *Kaup, Lophobr.* p. 53.

D. 39–40. Osseous rings 17 + ca. 72.

Snout very long, nearly twice as long as the remaining part of the head. Operculum with a distinct longitudinal ridge. Vent below the posterior third of the dorsal fin. Tail more than twice as long as the trunk; egg-pouch extending over fourteen rings. Upper parts uniform brownish (in spirits); abdomen with a brown cross bar on each suture between the rings.

Australia.

a. Female, $4\frac{1}{3}$ inches long. Australia. Purchased of Mr. Dalton.
b. Female, 4 inches long.

9. NEROPHIS *.

Nematosoma, *Eichwald* (preoccupied).
Scyphius, *Risso*.
Nerophis, (*Rafinesque*) *Kaup*.

Body smooth, rounded, with scarcely any of the ridges distinct. Pectoral fin none, caudal absent or rudimentary, tail tapering into a point. Dorsal fin of moderate length, opposite to the vent. The eggs are attached to the loose integument of the abdomen of the male, and are not covered by lateral folds.

Coasts of Europe, Atlantic; (Bombay).

---

* 1. Scyphius violaceus, *Risso, Eur. Mérid.* iii. p. 187.—"Corpore angusto, subpentagono, violaceo; rostro brevissimo, rotundato, altitudinem (corporis) subæquante."—D. 39.—Nice.

2. —— annulatus, *Risso, l. c.* p. 188.—"Corpore cylindrico, rotundato, luteo-virescente; cauda brevi."—D. 40.—Nice.

1. Nerophis æquoreus.

Sibbald, Scot. Illustr. ii. p. 24, tab. 19.

Syngnathus æquoreus, *Linn. Syst. Nat.* i. p. 417; *Mont. Werner. Mem.* i. p. 85, tab. 4. fig. 1; *Fleming, Brit. An.* p. 176; *Jenyns, Man.* p. 486 (♀); *Yarrell, Brit. Fish.* 2nd edit. ii. p. 442, and 3rd edit. ii. p. 409; *Fries, Vet. Akad. Handl.* 1837, p. 35, or *Wiegm. Arch.* 1838, p. 246, tab. 6. fig. 3; *Parnell, Werner. Mem.* vii. p. 398; *Kröyer, Danm. Fisk.* iii. p. 705.

Pipe Fish, *Pennant, Brit. Zool.* iii. pl. 23. fig. 61 (not descript.).

Syngnathus sibbaldi, *Walbaum, Artedi,* iii. p. 6.

—— anguineus, *Jenyns, Cat. Brit. Vert.* p. 30; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 445, 3rd edit. ii. p. 414.

—— ophidion, *Jenyns, Man.* p. 487 (♂); *Parnell, Werner. Mem.* vii. p. 399.

Scyphius æquoreus, *Nilss. Skand. Faun. Fisk.* p. 692.

Nerophis æquoreus, *Kaup, Lophobr.* p. 66.

—— anguineus, *Kaup, l. c.* p. 65.

Ocean Pipe-fish, *Couch, Fish. Brit. Isl.* iv. p. 356, pl. 240.

Snake Pipe-fish, *Couch, l. c.* p. 359, with fig.

D. 38–44. Caudal fin rudimentary, very indistinct. Vent opposite to the posterior third of the dorsal fin, before the middle of the total length. Snout equal to, or rather longer than, the remaining part of the head. Body with from 28 to 30 osseous rings. The length of the head is contained thrice and two-thirds to four times and one-half in its distance from the vent. All the shields smooth.

Northern and western coasts of Europe; New Orleans.

a. Adult: dried. Flemsöe (Norway). Presented by Mr. H. Spindler.
b. Adult. Bohuslän. Presented by Hr. A. W. Malm.
c–d. Young. North Atlantic.
e. Adult: skin. Holland. From Gronow's Collection.
f. Adult. Great Britain. Presented by Dr. Johnson.
g–k. Adult: dried. England.
l–n. Adult and half-grown. South Devon. Museum Leach.
o. Adult. Dorsetshire. From Yarrell's Collection.
p. Fine specimen. Guernsey. Presented by Dr. A. Günther.
q. Young. Atlantic, north of the Azores. From Mr. J. T. Rouse's Collection.
r. Half-grown. Atlantic. From M. Sallé's Collection.
s–t. Half-grown. New Orleans.
u, v, w–y. Adult and young.

2. Nerophis dumerilii.

Nerophis dumerilii, *Steindachner, Sitzgsber. Ak. Wiss. Wien,* 1868, lvii. p. 1002.

D. 37. Caudal fin rudimentary, six-rayed. The dorsal fin commences behind the twentieth ring, and stands on ten rings, three of which belong to the tail. Snout half as long as the head. An obtuse ridge above the operculum, continued to the hind margin of the orbit. Forehead concave. Tail twice as long as the trunk. (*Steind.*)

Bombay.

3. Nerophis ophidion.

Syngnathus, sp., *Artedi, Gen.* p. 1. no. 2; *Synon.* p. 2. no. 4; *Spec.* p. 1. no. 1.
—— ophidion, *L. Syst. Nat.* i. p. 417; *Bl.* iii. p. 146, tab. 91. fig. 3; *Lacép.* ii. p. 48; *Bl. Schn.* p. 515; *Ekström, Vet. Ak. Handl.* 1831, p. 280, tab. 2. figs. 3 & 4, or *Fisch. Mörkö*, p. 134, tab. 6. figs. 3–4; *Fries, Vet. Ak. Handl.* 1837, p. 36, tab. 3. fig. 4, or *Wiegm. Arch.* 1838, p. 248, tab. 6. fig. 4; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 447, 3rd edit. ii. p. 416; ? *Risso, Ichth. Nice*, p. 68.
Scyphius ophidion, *Nilss. Skand. Faun.* iv. p. 694.
Syngnathus lumbriciformis, *Jenyns, Manual*, p. 488.
? Scyphius annulatus, *Risso, Eur. Mérid.* iii. p. 187.
Nerophis ophidion, *Kröyer, Danm. Fisk.* iii. p. 716; *Kaup, Lophobr.* p. 70; *Malmgren, Wiegm. Arch.* 1864, p. 343.
Straight-nosed Pipe-fish, *Couch, Fish. Brit. Isl.* iv. p. 363, with fig.

D. 34–38. Caudal fin none, the very thin and slender body tapering into an almost filiform tail. Vent opposite to the anterior third of the dorsal fin, in the middle of the total length. Snout somewhat shorter than the remaining part of the head. Body with thirty or thirty-one osseous rings. The length of the head is one-sixth or two-thirteenths of its distance from the vent. Shields inconspicuous, smooth.

Northern coasts of Europe; Mediterranean (Kaup).

a, b. Nine inches long. England. From the Haslar Collection.
c–d. Adult: dried. From Mr. Yarrell's Collection.
e–f. Young. Bohuslän. Presented by Hr. A. W. Malm.

4. Nerophis heckelii.

Nerophis heckeli, *Kaup, Lophobr.* p. 66.

D. 38–39. Caudal fin rudimentary, with five rays. Dorsal fin standing on ten rings, three of which belong to the body. Tail a little longer than the body. The anterior margin of the orbit occupies the middle of the length of the head. Body with twenty-eight osseous rings. The length of the head is two-ninths of its distance from the vent. (*Kaup.*)

Bogotá.

The same author describes *Nerophis martinicensis* as a distinct species (*l. c.* p. 67); but the characters given do not appear to be sufficient for specific distinction.

5. Nerophis papacinus.

Syngnathus papacinus, *Risso, Ichth. Nice*, p. 69, pl. 4. fig. 7.
—— fasciatus, *Risso, l. c.* p. 70, fig. 8.
Scyphius fasciatus, *Risso, Eur. Mérid.* iii. p. 185.
—— papacinus, *Risso, l. c.* p. 186.
Nerophis annulatus, *Kaup, Lophobr.* p. 69.

D. 26–28. Caudal fin none, the very thin and slender body tapering to an almost filiform tail. Vent nearly opposite to the middle of the dorsal fin, the tail being much longer than the body. Snout shorter than the postorbital part of the head, slightly turned upwards. Body with twenty-two osseous rings. The length of the head is nearly one-fifth of its distance from the vent. Shields inconspicuous, covered with thin skin. Tail generally with series of light ocelli, passing into cross bands on the trunk.

Mediterranean.

a. Several fine examples. Mediterranean. Purchased of Mr. Cutter.
b–c. Adult. South Europe. Presented by R. B. Webb, Esq.
d–e. Adult. Gibraltar. Presented by P. L. Sclater, Esq.
f, g. Adult. From the collection of Dr. van Lidth de Jeude.
h–l. Adult male and female and half-grown.

6. Nerophis teres.

Scyphieus teres, *Rathke, Mém. Ac. Sc. St. Pétersb.* iii. 1836, p. 319.
Nerophis teres, *Kaup, Lophobr.* p. 71.

D. 32. Caudal fin none, the very thin and slender body tapering into an almost filiform tail. Vent opposite to the commencement of the second third of the dorsal fin, the tail being much longer than the body. Snout shorter than the remaining part of the head. Body with twenty-nine or thirty osseous rings. Yellowish, with minute blackish dots. (*Rathke.*)

Crimea.

7. Nerophis lumbriciformis.

Acus lumbriciformis, *Willughby, Hist. Pisc.* p. 160.
Little Pipe fish, *Pennant, Brit. Zool.* iii. p. 124, pl. 23. no. 62, or ed. 1812, iii. p. 187. no. 62.
Syngnathus ophidion, *Flem. Brit. An.* p. 176.
—— lumbriciformis, *Yarrell, Brit. Fish.* ii. p. 450, or 3rd edit. ii. p. 420; *Fries, Wiegm. Arch.* 1838, p. 249, tab. 6. figs. 5–8, or *Vet. Ak. Handl.* 1837, p. 38, tab. 3. figs. 5–8.
Scyphius lumbriciformis, *Nilss. Skand. Faun.* iv. p. 695.
Nerophis lumbriciformis, *Kröyer, Danm. Fisk.* iii. p. 723; *Kaup, Lophobr.* p. 69.

D. 26. Caudal fin none. Vent opposite to the anterior third of the dorsal fin, the tail being much longer than the body. Snout considerably shorter than the postorbital part of the head, turned upwards. Body with nineteen osseous rings. The length of the head is contained thrice and one-third in its distance from the vent. Shields inconspicuous, covered with thin skin.

Northern coasts of Europe.

a. Several specimens. Plymouth. Museum Leach.
b. Adult. Falmouth. Purchased.
c–d, e–g. Adult. Great Britain.
h. Several adult and half-grown examples. Guernsey. Presented by Dr. A. Günther.

10. PROTOCAMPUS.

Shields covered with skin; a broad cutaneous fold (adipose fin) runs along the back in front and behind the dorsal; a similar fold along the abdomen. Pectoral fin none, caudal very small.

The mode of gestation of ova is not known in this fish; but I conclude, from its great affinity to *Nerophis* (of which it may be considered an embryonic form), that the ova are attached to the abdomen, and not to the tail.

Falkland Islands.

1. Protocampus hymenolomus.

Syngnathus hymenolomus, *Richards. Voy. Ereb. & Terr. Ichth.* p. 52, pl. 30. figs. 11–13.

Nerophis hymenolomus, *Kaup, Lophobr.* p. 67 (cop. from *Richards.*).

D. 40–41. Caudal fin very small, with eight rays. Vent behind the middle of the dorsal fin, in the middle of the total length. Snout rather longer than the remaining part of the head. Body with 29 or 30 semiossified rings, compressed. The length of the head is one-fifth of its distance from the vent. Body covered with skin.

Falkland Islands.

a–d. Types of the species: females. Falkland Islands. Presented by W. Wright, Esq.

e–f. Adult females. Australia? From the Haslar Collection.

Second Group. HIPPOCAMPINA.

Tail without caudal fin, prehensile.

11. GASTROTOKEUS.

Gasterotokeus, *(Heckel) Kaup, Lophobr.* p. 18.

Body depressed, the lateral line running along the margin of the abdomen. Shields smooth. Tail shorter than the body, prehensile. Pectoral fins. The males carry the eggs, which are imbedded in soft membrane on the abdomen, without a pouch being formed by a lateral expansion of the integuments.

Indian Ocean to China and Australia.

1. Gastrotokeus biaculeatus.

Valent. Amb. iii. p. 500. no. 481; *Renard*, fig. 73.

Syngnathus biaculeatus, *Bl. Ausl. Fisch.* iv. p. 10, tab. 121. figs. 1 & 2; *Bl. Schn.* p. 515, tab. 107; *Cant. Mal. Fish.* p. 387.

—— tetragonus, *L. Gm.* i. p. 1453; *Lacép.* ii. p. 42.

Syngnathoides blochii, *Bleek. Nat. Tyds. Ned. Ind.* ii. p. 259.

Solegnathus blochii, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 24.

Gasterotokeus biaculeatus, *Kaup, Lophobr.* p. 19.

D. 40–45. P. 17–23. Osseous rings 18 + 45–55.

Superciliary margin terminating behind in a more or less distinct spine. Old individuals sometimes with minute filaments on the lower side of the head, body, and tail. Origin of the dorsal fin nearly opposite to the vent.

Indian Ocean to China and Australia.

a, b, c, d. Many adult and half-grown specimens. Zanzibar. From Lieut.-Col. Playfair's Collection.
e. Adult. Seychelles. Presented by Lieut.-Col. Playfair.
f, g. Adult. East-Indian archipelago.
h–k. Adult. Singapore.
l–p. Adult and half-grown. Amboyna. Purchased of Hr. Frank.
q–r. Adult. Celebes.
s. Adult. Philippine Islands. Purchased of Mr. Cuming.
t, u–v. Adult and half-grown. China Seas. Presented by Vice-Admiral Sir E. Belcher.
w–x. Adult. Cape York. From Hr. Dämel's Collection.
y. Adult. North-west Australia. Presented by Sir J. Richardson.
z. Several dried specimens.

12. SOLENOGNATHUS.

Solenognathus, (*Swainson*) *Kaup, Lophobr.* p. 19.

Body compressed, deeper than broad, only in adult females somewhat dilated. Shields hard, rugose, with round or oval interannular plates; no elongate processes. Tail shorter than the body, prehensile. Pectoral fins.

Chinese and Australian Seas.

All the specimens in the British Museum are unfortunately dried, so that the sexes cannot be exactly ascertained; but although some of them must be of male sex, there is no trace of a pouch or other receptacle for the ova.

1. Solenognathus hardwickii.

Syngnathus hardwickii, *Gray, Ind. Zool.* c. fig.
Solegnathus polyprion, *Bleek. Verh. Bat. Gen.* xxv. *Trosk.* p. 25.
Solenognathus hardwickii, *Kaup, Lophobr.* p. 20.

D. 43–45. Osseous rings 26–27 + 55–60.

Dorsal surface slightly concave or flat. Shields very rough and rugose, but with scarcely any spines; operculum with radiating granulated lines; a cluster of prominent tubercles on the hinder part of the superciliary edge.

Chinese and Australian Seas. (There is no evidence that this species occurs in India proper; also the typical specimens came from China.)

a–b. Adult: types of the species. China. Presented by General Hardwicke.
c. Many adult and half-grown examples. China.
d. Adult. Houtman's Abrolhos.

As in certain species of *Syngnathus*, the relative depth of the body varies in females, old examples having it much deeper than young.

2. Solenognathus spinosissimus.

Very much resembling *S. hardwickii*, but readily distinguished by the following characters:—

D. 35. Osseous rings 27 + 55.

Dorsal surface slightly convex. All parts covered with small but very distinct spines; the radiating lines of the operculum spiny. Orbital edge denticulated, but without prominent tubercles above.

Tasmania.

a–b. Thirteen inches long. Presented by Dr. Milligan.

These specimens are evidently females, having the hinder part of the body considerably elevated, much more so than in specimens of the same size of *S. hardwickii*. In one the length of the trunk is 4½ inches, and the depth 1 inch; in the other the proportion is as 4½ to ⅚.

13. PHYLLOPTERYX.

Phyllopteryx, (*Swainson*) *Kaup, Lophobr.* p. 20.
Haliichthys, *Gray, Proc. Zool. Soc.* 1859, p. 38.

Body compressed, or as broad as deep. Shields smooth, but some or all of them are provided with prominent spines or processes on the edges of the body; some of the processes with cutaneous filaments. A pair of spines on the upperside of the snout and above the orbit. Tail about as long as the body, prehensile. Pectoral fins. The males carry the eggs, which are imbedded in soft membrane on the lower side of the tail, without a pouch being formed by a lateral expansion of the integuments (*Ph. foliatus*).

Australia.

a. Body compressed, elevated: PHYLLOPTERYX.

1. Phyllopteryx foliatus.

Syngnathus foliatus, *Shaw, Gen. Zool.* v. p. 456, pl. 180.
—— tæniopterus, *Lacép. An. Mus.* iv. pl. 58. fig. 3.
Phyllopteryx foliatus, *Kaup, Lophobr.* p. 21; *Günth. Proc. Zool. Soc.* 1865, pl. 14.

D. 30. Osseous rings 18 + 35.

Trunk much elevated, especially in females, in which its depth sometimes equals the length of the snout. A pair of small spines on the upper part of the snout, much nearer to the eye than to its extremity; a pair of superciliary spines. A long occipital and nuchal process, which, as well as all the other processes on the body, bear cutaneous appendages. Pairs of long divergent processes along the back on the twelfth body-ring, and on the 1st, 10th, 16th, 24th, and 27th tail-rings. A similar pair of ventral processes on the 9th body-ring. Scarlet or orange-coloured, with numerous small round yellow spots. Each of the nine anterior body-rings with a violet band on the lower half; two or three similar bands before the vent.

South Australia and Tasmania.

a. Fine male example, in spirits. Tasmania.
b–d. Adult females and male. Tasmania.

e. Adult females. New South Wales. From Mr. Macleay's Collection.
f. Adult females. Port Jackson. Voyage of the 'Herald.'
g–i. Adult males. Australia.

This species varies a little in the form of the principal processes, but none of the variations proves to be a constant character.

2. Phyllopteryx eques.

Günth. Proc. Zool. Soc. 1865, p. 327, pl. 15.

D. 37. Osseous rings 19+36.

The snout is as long as the distance of the front margin of the orbit from the hind part of the nape; it bears a pair of small spines behind the middle of its upper edge, a pair of minute barbels at the chin, and a pair of long appendages in the middle of its lower part. The forehead bears an erect, broad, subquadrangular crest, with a shorter single spine behind; a horizontal spine above each orbit; a cluster of spines with narrow appendages on the occiput. Nape of the neck with a long spine, dilated at the base into a crest, and carrying a long bifid appendage.

The trunk is compressed, somewhat dilated, strongly arched on the back, and with two deep indentations in its lower profile. The spines are of three kinds:—1. The band-bearing spines are the strongest, strongly compressed, not flexible, each terminating in a pair of short points. There are one pair of these spines in the middle of the back, and one on each of the three prominences of the abdominal outline; the flaps are long and bifid. 2. Very long, compressed, and somewhat flexible spines, without appendages; these occupy in pairs the uppermost part of the back, and in a single series the median line of the belly. 3. Small, short, conical spines run in single series along the median line of the sides, and along the lateral edges of the belly; a pair of similar spines in front of the lower part of the base of the pectoral fin. Tail quadrangular, with sharp edges, and with five pairs of band-bearing spines along its upperside. Dorsal fin situated entirely on the tail.

Australia.

a. Type of the species. Port Lincoln. Presented by G. F. Angas, Esq.

β. *Body as broad as deep*: HALIICHTHYS.

3. Phyllopteryx tæniophorus.

Haliichthys tæniophora, *Gray, Proc. Zool. Soc.* 1859, p. 38, pl. 7.

D. 25. Osseous rings 21+45.

Body as broad as deep, as long as the tail. Each shield with a prominent spine on each edge, except on the lowerside of the prehensile portion of the tail. Snout with a pair of spines above, in the middle of its length. A pair of supra- and infraorbital spines; several spines on the median line of the crown and nape. Many of the spines are band-bearing, but these do not differ in form or size from the others. The vent is below the middle of the dorsal fin. Broad irregular dark-brown bands across the back.

Australia.

a. Type of the species, female, 11 inches long. Freycinet's Harbour. Voyage of the 'Herald.'

b. Young. Australia.

14. ACENTRONURA.

Acentronura, *Kaup, Lophobr.* p. 18.

Trunk slightly compressed, composed of thirteen (twelve ?) rings. Shields without tubercles. Occiput compressed into a crest, without coronet. Tail prehensile, finless *. Pectoral fins. The edge of the trunk is continuous with that of the tail. Egg-pouch as in *Hippocampus*.

Japan.

1. Acentronura gracillima.

Hippocampus gracilissimus, *Schleg. Faun. Japon. Poiss.* p. 274, pl. 120. fig. 7.

Acentronura gracillima, *Kaup, Lophobr.* p. 18.

Dorsal fin with seventeen rays, standing on four rings, two of which belong to the tail. Snout short.

Japan.

15. HIPPOCAMPUS †.

Hippocampus, *Leach, Zool. Misc.* 1814, p. 103.

Trunk compressed, more or less elevated, composed of from ten to twelve rings. Shields with more or less prominent tubercles or spines. Occiput compressed into a crest, terminating at its supero-posterior corner in a prominent knob (coronet). Supraorbital, temporal, and humeral regions with prominences. Tail prehensile, finless. Pectoral fins. The males carry the eggs in a sac at the base of the tail, opening near the vent.

Inhabitants of all the seas of the temperate and tropical regions. They are pelagic fishes which attach themselves to seaweed or other floating substances, and are liable to be carried by currents to great distances. Consequently some species are spread over different parts of the globe, like *Antennarius,* a genus the geographical distribution of which nearly coincides with that of *Hippocampus.*

---

* Traces of a small "caudal" are mentioned in Schlegel's description; but this is evidently a slip of the pen for "anal."

† 1. Hippocampus algiricus, *Kaup, Lophobr.* p. 13.—Algiers.

2. —— marginalis, *Kaup, Lophobr.* p. 15.—Mexico.

3. —— fascicularis, *Kaup, Lophobr.* p. 15.—Mexico.

4. —— fuscus, *Rüppell, N. W. Fische*, p. 143. taf. 33. fig. 3.—Red Sea.

5. Syngnathus hippocampus, *Mitch. Trans. Lit. & Phil. Soc. N. York*, i. p. 475; Hippocampus brevirostris, *Storer, Report*, p. 167; Hippocampus hudsonius, *Dekay, Fauna N. York, Fish.* p. 322, pl. 53. fig. 171 (bad); *Storer, Mem. Am. Acad.* ii. p. 491, and viii. p. 416, pl. 33. fig. 4; *Lockwood, Amer. Nat.* 1867, p. 225.—Atlantic coasts of the United States.

6. Hippocampus gracilis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 282. —California.

7. —— ingens, *Girard, U. S. Pac. R. R. Explor. Fish.* p. 342.—California.

The species are difficult to distinguish, on account of the great amount of variation to which the development of the tubercles, shape of shields, and length of snout are subject. The number of dorsal rays appears to be very constant.

1. Hippocampus abdominalis.

Lesson, in Férussac, Bull. Sc. Nat. xi. 1827, p. 127; *Kaup, Lophobr.* p. 17; *Bleek. Verh. Ak. Wet. Amsterd.* ii. *Van Diemen's Land,* p. 28.

Dorsal fin with from twenty-eight to thirty-one rays. Tubercles not much developed and very obtuse; those on the head sometimes with simple filaments. Length of the snout rather more than, or equal to, the distance between the posterior margin of the orbit and the gill-opening in adult examples, but shorter in younger individuals. Body generally with large round brown spots, more or less confluent into bands on the hinder part of the tail; head with much smaller round brown spots, of which those round the orbit are the most constant. Sometimes uniform blackish brown.

Two examples in the collection have been curiously painted by a collector, viz. tail and snout black, the remainder yellow. This is perhaps another variation of colour.

Seas of Australia and New Zealand.

a. Several adult (13 inches long) and half-grown specimens. Australia.

b–d. Adult and half-grown. Port Arthur. From the Haslar Collection.

e–f. Half-grown. Sydney. Presented by Sir J. Richardson.

g. Adult (11 inches long). Tasmania. Purchased.

h–k. Adult (13 inches long) and half-grown: dried. Tasmania. Presented by Dr. Milligan.

l. Many half-grown specimens. George Town. Presented by R. Gunn, Esq.

m–p. Adult and half-grown. Mouth of the Tamar. Presented by Sir W. Hooker.

q–s. Adult: dried. New Zealand.

t. Half-grown. New Zealand. Presented by Captain Stokes.

u, v–w. Half-grown. Bay of Islands.

2. Hippocampus antiquorum.

Sea-horse, Short-snouted Hippocampus.
Ἱππόκαμπος, *Ælian,* lib. 14. cap. 14.
Hippocampus, *Rondel. De Pisc.* ii. p. 114.
Cheval marin, *Bellon. De Aquat.* p. 444.
Hippocampus rondeletii, *Willughby, Hist. Pisc.* p. 157, tab. I. 25. fig. 3.

Syngnathus, sp., *Artedi, Synon.* p. 1. no. 1; *Spec.* p. 3.
Syngnathus hippocampus, *L. Syst. Nat.* i. p. 417; *Brünn. Pisc. Mass.* p. 10; *Bl. Ausl. Fisch.* iv. p. 6, taf. 109. fig. 3.
Hippocampus antiquorum, *Leach, Zool. Misc.* i. 1814, p. 104.
—— brevirostris, *Cuv. Règne An.*; *Yarr. Brit. Fish.* 2nd edit. ii. p. 452; *Schleg. Faun. Japon. Poiss.* p. 274; *Kaup, Lophobr.* p. 7; *Couch, Hist. Brit. Fish.* iv. p. 364, pl. 241. fig. 4 (bad).
—— japonicus, *Kaup, Lophobr.* p. 7.

Dorsal fin with twenty (nineteen) rays. Tubercles generally well developed on the head and body, and subacute, rarely blunt. Length of the snout equal to the distance between the hind margin of the orbit and gill-opening. Spines on the head and neck sometimes with simple filaments. Brown, with bluish-white dots, more or less confluent into lines on the lower part of the side and gill-cover; dorsal fin with a black submarginal band.

Mediterranean; Atlantic; Australia.

a. Adult. Dalmatia. Purchased of Dr. J. Heckel.
b–c. Adult. Mediterranean. Purchased.
d. Half-grown: dried. Mediterranean. Presented by Mrs. Mauger.
e–g. Half-grown. Malta. From the Haslar Collection.
h–i. Half-grown: dried.
k. Adult. England.
l. Half-grown. Fernando Po. From Major Burton's Collection.
m. Half-grown. Cape York (North Australia). From Hr. Dämel's Collection.
n. Half-grown: dried. Australia? Purchased of Mr. Argent.
o–q. Half-grown. From the Haslar Collection.
r, *s*, *t*, *u*. Many adult, half-grown, and young specimens, without indication of the localities.

3. **Hippocampus breviceps.**

Peters, Monatsber. Ak. Wiss. Berlin, 1869, p. 710.

Dorsal fin with from nineteen to twenty-one rays, standing on five rings, two of which belong to the tail. Some of the tubercles are prominent, but obtuse. Snout very short, scarcely as long as the operculum. Supraorbital process well developed, subvertical, triangular. Coronet as high as the orbit, with ridges, but without spines at the top. Eleven body-rings. Hind part of the trunk considerably dilated. Head and body with numerous very small white, dark-edged ocelli; operculum with brown dots besides; tail with narrow irregular yellowish rings.

Tasmania and South Australia.

a–d. Adult females and males, 2 to 2½ inches long. Tasmania. Presented by Dr. Milligan.
e. Adult. Australia. Presented by Mr. Bowerbank.

4. **Hippocampus angustus.**

Dorsal fin with nineteen or twenty rays, standing on two body- and on two tail-rings. Eleven body-rings. Body but little dilated in males, in which its greatest depth is about half the length of the head; females still narrower. Tubercles prominent, acute, without tentacles. Supraorbital spine erect, simple, pointed; lower breast-spines double on each side. Coronet rather low, connected by a narrow, concave, bony bridge with the occipital knob. The length of the snout equals the distance between the anterior margin of the orbit and gill-opening. Snout, head, body, and dorsal fin finely reticulated with brown; some specimens covered with minute white dots besides.

Freycinet's Harbour.

a. Several specimens, 6 inches long. Voyage of the 'Herald.'

5. Hippocampus novæ hollandiæ.

Steindachner, Sitzgsber. Ak. Wiss. Wien, 1866, liii. p. 474, taf. 1. fig. 2.

Dorsal fin with sixteen or seventeen rays. Eleven body-rings. Tubercles prominent, acute, without tentacles. Supraorbital spine simple, slender. Coronet elevated; that part of the coronet which connects it with the occipital knob is long, strong, with the anterior profile not concave. The length of the snout is equal to the distance of the anterior margin of the eye from the gill-opening. Snout, head, and body finely marbled and reticulated with brown.

New South Wales.

a, b, c, d. Numerous examples. Sydney.

e. Very old specimen. South Australia.—In this example all the tubercles are very obtuse and rounded off.

6. Hippocampus ramulosus.

Hippocampus ramulosus, *Leach, Zool. Misc.* i. 1814, p. 105, tab. 147; *Lowe, Fish. Madeira,* p. 6, tab. 2; *Kaup, Lophobr.* p. 10.

? Hippocampus rosaceus, *Risso, Eur. Mérid.* iii. p. 184.

Dorsal fin with eighteen rays. Tubercles very prominent and pointed, and many of them, especially those on the head, with ramified tentacles. Coronet very elevated, its top with several points. Length of the snout a little less than the distance between the hind margin of the orbit and gill-opening. Rose-coloured, indistinctly marbled with brownish and white. Dorsal fin with a blackish submarginal band.

Madeira; ? Mediterranean.

a. Adult: type of the species. Old Collection.

b–c. Adult. From the Collection of the Zoological Society.

d, e. Half-grown. Madeira.

7. Hippocampus longirostris.

? *Willughby,* tab. J. 25. fig. 4.

? Hippocampus longirostris, *Cuv. Règne An.*

Hippocampus longirostris, *Schleg. Faun. Japon. Poiss.* p. 273.

Dorsal fin with seventeen or eighteen rays. Eleven body-rings. Tubercles prominent, acute, without tentacles. Supraorbital spine simple, straight, pointed; coronet rather low. That part of the coronet which connects it with the occipital knob is short and narrow. The length of the snout equals the distance of the posterior margin of the orbit from the lateral spine of the neck. Coloration uniform (in preserved specimens).

Japan and China.

a. Adult. China Seas. Presented by Vice-Admiral Sir E. Belcher.
b–c. Adult (11 inches) and half-grown. Formosa. From Consul Swinhoe's Collection.
d. Adult.

8. Hippocampus guttulatus.

α. Synonymy for Atlantic specimens.

Syngnathus, sp., *Brown, Jam.* p. 441. no. 1.
Hippocampus guttulatus, *Cuv. Règne Anim.*; *Kaup, Lophobr.* p. 9.
—— punctulatus, *Guichen. in Sagra, Cuba Poiss.* p. 174 [*], pl. 5. fig. 2; *Kner, Novara, Fische*, p. 390.
—— longirostris, *Kaup, Lophobr.* p. 12, pl. 3. fig. 2.

β. Synonymy for Indian specimens.

Hippocampus kuda, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 82; or *Verh. Bat. Gen.* xxv. *Trosk.* p. 26.
—— moluccensis, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 305.
—— tæniopterus, *Bleek. l. c.* p. 306.
—— polytænia, *Bleek. l. c.* vi. p. 338.
—— melanospilus, *Bleek. l. c.* p. 505.
—— comes, *Kaup, Lophobr.* p. 10; *Day, Fish. Malabar*, p. 262 (not *Cant.*).
—— punctulatus, *Kaup, Lophobr.* p. 14.
—— punctulatus, guttulatus *et* monckei, *Günth. Fish. Zanz.* p. 139.

Dorsal fin with seventeen (eighteen) rays. Tubercles generally obtuse and blunt. The supraorbital spine is obliquely truncated, compressed, or with its anterior portion sometimes slightly detached. Coronet low. The length of the snout is equal to, or a little more than, the distance between the hind margin of the orbit and the gill-opening in full-grown examples, and equal to it, or rather less, in half-grown. (Only in a few of our examples have I found some filaments.) The coloration varies.

Tropical parts of the Atlantic; Indian Ocean and archipelago; Japan.

α. Light or dark brown, marbled with darker on the back; all parts with numerous small black and still smaller white dots.

aa. *Atlantic specimens.*

a. Half-grown. Gambia. Presented by Sir A. Smith.
b–d, e–g. Adult and half-grown. Caribbean Sea.
h. Adult. Hayti. From the Collection of the Zoological Society.

---

[*] This author states the number of dorsal rays as 22, but does not appear to be certain of it.

i–k. Adult and half-grown. Port au Prince. From the Collection of the Zoological Society.
l, *m–n*. Adult and half-grown. Cuba. From the Collection of the Zoological Society.
o. Half-grown. Surinam. From the Collection of Dr. van Lidth de Jeude.
p–t. Adult. Bahia. From Dr. Wucherer's Collection.
u–v. Adult and half-grown. Museum Leach.
w, *x*, *y*. Adult and half-grown.

bb. *Indian specimens.*

z, α–δ, ε–θ. Half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.
ι. Type of *H. kuda*. East-Indian archipelago. From Dr. Bleeker's Collection.
κ–λ. Adult and half-grown. Amboyna.
μ. Adult: dried. Madras.
ν. Adult. Singapore. From the Collection of the East-India Company.
ξ. Adult. Japan. Purchased of Mr. Jamrach.

β. *Nearly uniform dark brown.*

aa. *Atlantic specimens.*

ο. Adult. West coast of Africa.
π. Adult: dried. Brazil. Presented by Mrs. Parker.
ρ. Half-grown: dried. Jamaica. From Dr. Parnell's Collection.

bb. *Indian specimens.*

ς. Half-grown. Red Sea. Collected by W. Jesse, Esq.
τ–υ. Adult and half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.

γ. *Light brown, with very broad irregular black or brown cross bands.*

aa. *Atlantic specimens: head and end of the tail black.*

φ–ψ, ω–*a*′. Adult. St. Croix. Presented by Prof. Newton.

bb. *Indian specimens: head dotted with black.*

b′. Type of *H. polytænia*. Floris. From Dr. Bleeker's Collection.
c′. Adult. Amboyna. Purchased of Hr. Frank.

δ. *Black, with brown cross bands; a few scattered brown spots on the body and tail and edge of the abdomen.*

d′. Half-grown. Rio Janeiro. Collected by Dr. Cunningham.
e′. Half-grown. Amboyna. From Dr. Bleeker's Collection.—Type of *Hippocampus melanospilus*.
f′. Half-grown.

Hippocampus deanei, Duméril, Arch. Mus. x. 1858, p. 243, from Sierra Leone, is perhaps not specifically distinct from *H. guttulatus*. It is characterized thus:—D. 17. Snout as long as the postorbital part of the head. Coronet flat above, terminating behind in three rounded denticulations, and in front, at its base, with four small obtuse tubercles. A protuberance on each side of the head between the coronet and the supraorbital ridge. Three protuberances below the head, one median and two lateral. [This is not a specific character.]

9. Hippocampus trimaculatus.

Hippocampus trimaculatus, *Leach, Zool. Misc.* p. 104.
—— mannulus, *Cant. Mal. Rept.* p. 388, pl. 11. fig. 1; *Kaup, Lophobr.* p. 14.
? Hippocampus chinensis, *Basilewsky, Nouv. Mém. Nat. Mosc.* x. 1855, p. 249.
? Hippocampus kampylotrachelos, *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 107.
? Hippocampus manadensis, *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado*, p. 79.

Dorsal fin with twenty (nineteen) rays. Eleven body-rings. Tubercles not much developed, the coronet especially being very low, though terminating in four or five small spines. The supraorbital spine and that on each side of the throat are very similar in shape, claw-shaped, acute, curved, bent backwards and inwards. Length of the snout rather more than the distance between the hind margin of the orbit and the gill-opening. Frequently three large brown spots immediately below the dorsal profile, on the first, fourth, and seventh body-rings.

China Seas; Pinang; Tenasserim.

a. Numerous adult and half-grown examples, dried and in spirits. China Seas. Among them the types of the species.
b–c. Types of *H. mannulus.* Pinang. From Dr. Cantor's Collection.
d. Adult. Tenasserim. Presented by Dr. Packmann.

10. Hippocampus comes.

Cantor, Mal. Fish. p. 389, tab. 11. fig. 2.

Eleven body-rings. Dorsal fin with sixteen rays. Tubercles rather prominent, hook-like, bent backwards. A pair of small, erect, pointed spines in front of and inwards to the usual supraorbital spines, which are erect and slender. Coronet very low. Snout rather longer than the distance between the hind margin of the orbit and the gill-opening.

Pinang.

a. Type of the species. From Dr. Cantor's Collection.

The anterior supraorbital spines are altogether different in direction and form from those which are sometimes found in specimens of other species, in which they are subject to variation, and of no value for specific distinction.

11. Hippocampus camelopardalis.

Hippocampus camelopardalis, *Bianconi, Nov. Comm. Inst. Sc. Bonon.* 1855, p. 145, pl. 1. fig. 3; *Peters, Monatsber. Ak. Wiss. Berlin,* 1868, p. 276.

—— subcoronatus, *Günth. in Fish. Zanz.* p. 139, pl. 20. fig. 4.

Dorsal fin with eighteen rays. Tubercles obtuse and blunt. The supraorbital spine is compressed at the base, simple, pointed, pointing outwards. Coronet elevated, subpentagonal at the top. Snout short, equal in length to the gill-cover. Eleven body-rings. Three small blackish spots immediately below the dorsal profile on the first, fourth, and seventh body-rings.

Zanzibar; Mozambique.

a. Type of *H. subcoronatus*. From Lieut.-Col. Playfair's Collection.

12. Hippocampus coronatus.

Schleg. Faun. Japon. Poiss. p. 274, pl. 120. fig. 8; *Kaup, Lophobr.* p. 16.

Ten body-rings only. The coronet is exceedingly high, as long as the snout. Process on each side of the base of the dorsal fin much developed, directed outwards and upwards. (*Schleg.*)

Japan.

13. Hippocampus lævicaudatus.

Kaup, Lophobr. p. 16, tab. 2. fig. 2.

Dorsal as long as the head, and standing on five rings. Body-rings eleven. Eyes nearly in the middle, between the end of the snout and gill-opening. Tail without knobs. Gill-cover silvery (*Kaup.*)

North America. The single typical specimen is in the Vienna Collection.

14. Hippocampus bicuspis.

Kaup, Lophobr. p. 13, tab. 3. fig. 1.

The spine that precedes the coronet (occipital) and the one over the nostril forked. Eleven body-rings. Traces of two dark cross bands on the snout. (*Kaup.*)

Known from a single very young specimen from Goree in the Paris Museum.

15. Hippocampus lichtensteinii.

Kaup, Lophobr. p. 8.

The coronet is a roundish elevated knob, with short spines in front and behind; head, gill-covers, and underpiece(?) of the snout warty, and there are some warts on the side of the body. The length of the snout equals the distance from the anterior margin of the orbit to the end of the operculum. Dorsal fin short, placed on the two last body-rings. (*Kaup.*)

? Red Sea. The typical example is in the Berlin Museum.

16. Hippocampus mohnikei.

Hippocampus mohnikei, *Bleeker, Verh. Ak. Wet. Amsterd.* 1854, i. p. 16.
? Hippocampus monikei, *Kaup, Lophobr.* p. 8.

Dorsal fin with thirteen rays; ten (or eleven)* body-rings; tubercles moderately developed; coronet rather low; tail with five broad white bands across the back and sides. (*Blkr.*)

Japan.

If the number of dorsal rays be correctly stated, it appears to be the chief character known at present by which to distinguish this species, which has been described from an example 60 millims. long. I formerly believed I had recognized this species in two specimens from Zanzibar; but since I have consulted Bleeker's original description, I do not think that this determination is correct.

17. Hippocampus hystrix.

Hippocampus histrix, *Kaup, Lophobr.* p. 17, tab. 2. fig. 5.

Dorsal fin with seventeen or eighteen rays. All the tubercles are developed into long, slender, acute spines. *Snout slender, as long as the distance of the front margin of the orbit from the first nuchal spine.* Light-coloured, with numerous white dots; snout with broad dark rings, each spine black at the tip.

Zanzibar; Japan.

a–b. Two and a half or three inches long. Zanzibar. From Lieut.-Col. Playfair's Collection.

18. Hippocampus erinaceus.

Dorsal fin with eighteen rays, standing on four rings, two of which belong to the tail. All the tubercles are developed into long, slender, acute spines. Supraorbital spine as high as the orbit, and a single (parietal) spine in front of the coronet, which is rather elevated, terminating in five spines. *Snout shorter than the distance of the front margin of the orbit from the gill-opening.* Breast-spines double on each side. Eleven body-rings.

Habitat ——?

a. Two and a half inches long (bleached). From the Haslar Collection.

---

* Bleeker, having a single specimen, says 10 or 11; Kaup states 10.

Order VI. PLECTOGNATHI.

Teleosteous fishes with rough scales, or with ossifications of the cutis in the form of scutes or spines; skin sometimes entirely naked. Skeleton incompletely ossified, with the vertebræ in small number. Gills pectinate; a narrow gill-opening in front of the pectoral fins. Mouth narrow; the bones of the upper jaw generally firmly united. A soft dorsal fin, belonging to the caudal portion of the vertebral column, opposite to the anal; sometimes elements of a spinous dorsal besides. Ventral fins none, or reduced to spines. Air-bladder without pneumatic duct.

Nearly all are marine fishes.

Plectognathi, *Cuv. Règne Animal.*

Synopsis of the Families.

Jaws with distinct teeth	1. **Sclerodermi**, p. 207.
Jaws modified into a beak	2. **Gymnodontes**, p. 269.

Fam. 1. SCLERODERMI.

Sclerodermi, *Cuv. Règne Animal.*

Snout somewhat produced; jaws armed with distinct teeth in small number. Skin with scutes or rough. The elements of a spinous dorsal and ventral fins generally present.

Marine fishes of the temperate or tropical regions.

Synopsis of the Groups and Genera.

First Group. **Triacanthina.**

Skin covered with small, rough, scale-like scutes. A spinous dorsal fin, with from four to six spines. A pair of strong moveable ventral spines, joined to the pelvic bone.

Teeth small, conical, in a double series ...... 1. *Triacanthodes*, p. 208.
Teeth small, conical, in a single series........ 2. *Hollardia*, p. 209.
Teeth in the outer series incisor-like .... 3. *Triacanthus*, p. 209.

Second Group. **Balistina.**

Body compressed, covered with moveable scutes, or rough. Spinous dorsal reduced to one, two, or three spines. Ventral reduced to a single pelvic prominence, or entirely absent.

Three dorsal spines......................... 4. *Balistes*, p. 211.
One (two) dorsal spine; no barbel .... 5. *Monacanthus*, p. 229.
A barbel .... 6. *Anacanthus*, p. 255.

Third Group. **Ostraciontina.**

The integuments of the body are modified into a firm carapace, formed of juxtaposed scutes. Spinous dorsal and ventral fins absent, sometimes indicated by protuberances.

Teeth small and slender, in a single series .... 7. *Ostracion*, p. 255.

First Group. TRIACANTHINA.

This group approaches most closely to the fishes of the more highly developed orders; and therefore we have placed it at the head of the Plectognaths.

1. TRIACANTHODES.

Triacanthodes, *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 37.

Body compressed, with short tail, covered with small spiny scales. Teeth small, conical, closely set, in a double series, about fourteen in the upper and twenty-two in the lower jaw. There is a pair of small teeth in the inner series. Anterior dorsal fin formed by from four to six strong spines. Ventral fins formed by a pair of strong spines joined to the pelvic bone.

Japan.

1. **Triacanthodes anomalus.**

Triacanthus anomalus, *Schleg. Faun. Japon. Poiss.* p. 295, tab. 129. fig. 3.
Triacanthodes anomalus, *Bleek. l. c.*

D. 4–6 | 14–16. A. 12–13.

The height of the body is contained twice and one-third in the total length (without caudal). Dorsal and ventral spines strong, rough on their basal halves. Uniform brownish.

Japan.

a–c. From 3 to 4½ inches long: stuffed. Japan.

2. HOLLARDIA.

Hollardia, *Poey, Mem. Cub.* ii. p. 348.

Body compressed, with short tail, covered with small spiny scales. A single series of ten small conical teeth in each jaw. Anterior dorsal fin formed by six spines, the first of which is much stronger and longer than the others. Ventral fins formed by a pair of strong spines joined to the pelvic bone.

West Indies.

1. Hollardia hollardi.

Poey, l. c. tab. 18. fig. 11.

D. 6 | 17. A. 14.

The height of the body is nearly one-half of the total length (without caudal). The upper and lower profiles of the snout equally oblique. (*Poey.*)

Cuba.

3. TRIACANTHUS.

Triacanthus, *Cuv. Règne Anim.*

Body compressed, covered with very small or minute rough scales. Tail narrow, prolonged. Teeth in a double series in each jaw, those of the outer series incisor-like, ten in number, those of the inner more rounded, two or four in number. Anterior dorsal fin with three or five small spines behind a very large one. Ventral fins formed by a pair of strong spines, joined to the pelvic bone. Vert. 9/10.

Indian and Australian Seas.

On the anatomy, see Hollard, Ann. Sc. Nat. 1853, xx. p. 77 *et seqq.*, pl. 3.

1. Triacanthus brevirostris.

Hoornvisch, *Nieuhof, Lant- en Zee-R.* p. 272.
Piscis cornutus, *Willughby, Append.* p. 5, tab. 10. fig. 2.
Balistes, sp., *Gronov. Mus.* i. p. 52. no. 115; *Zoophyl.* p. 53. no. 194. *Russell*, i. p. 14, pl. 21.
Balistes biaculeatus, *Benn. Fish. Ceyl.* pl. 15 (not *Bl.*).
Triacanthus brevirostris, *Schleg. Faun. Japon. Poiss.* p. 294, tab. 129. fig. 2; *Hollard, Ann. Sc. Nat.* 1854, i. p. 45, pl. 2. fig. 1; *Bleek. Atl. Ichth. Balist.* pl. 17. fig. 3.
—— biaculeatus, *Bleek. Verh. Bat. Gen.* xxii. *Madur.* p. 6 (not *Cuv.*).
—— rhodopterus, *Bleek. l. c.* xxiv. *Balist.* p. 25, tab. 4. fig. 8.
—— russellii, *Bleek. l. c.*
—— nieuhofi, *Bleek. l. c.* p. 26, tab. 4. fig. 9, or *Nat. Tyds. Ned. Ind.* iii. p. 459, or *Atl. Ichth.* v. p. 92, pl. 3. fig. 3.
—— brachysoma, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 128.
Balistes bipes, *Gronov. Syst.* ed. *Gray*, p. 37.

D. 5 | 22–25. A. 17–20.

The height of the body is contained from twice to twice and four-fifths in the total length (without caudal), young examples having a still deeper body. Snout not produced, with the upper profile nearly straight. Dorsal spine of adult examples shorter than the head, but as long and longer in young ones. There is a considerable interval between the dorsal fins in adult examples, whilst they are close together in young. Spinous dorsal with a black blotch.

East Indies, China, and Japan.

a. Adult (11 inches long). North China. Purchased of Mr. Jamrach.
b, *c*. Adult and young. China.
d. Adult: skin. China. Presented by J. R. Reeves, Esq.
e. Adult. Japan. Purchased of Mr. Jamrach.
f. Half-grown. Formosa. Presented by Dr. Collingwood.
g. Half-grown. Amboyna. Purchased of Hr. Frank.
h. Adult. East-Indian archipelago. From Dr. Bleeker's Collection as *T. brevirostris*.
i. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection as *T. nieuhofii*.
k. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *T. rhodopterus*.
l. Half-grown. East-Indian archipelago.
m. Young. East-Indian archipelago. From Dr. Bleeker's Collection. —Type of *T. brachysoma*.
n. Young. Madras. Presented by Capt. Mitchell.
o, *p*, *q*, *r*, *s*, *t*. Adult, half-grown, and young.
u. Adult: skeleton. Purchased.

2. **Triacanthus biaculeatus.**

Balistes biaculeatus, *Bl.* tab. 148. fig. 2.
Triacanthus biaculeatus, *Cuv. Règne An.*; *Cant. Mal. Fish.* p. 360; ? *Day*, *Fish. Malabar*, p. 260.
—— oxycephalus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 27, tab. 5. fig. 10, or *Nat. Tyds. Ned. Ind.* ii. p. 496, or *Atl. Ichth.* v. p. 90, *Balist.* pl. 6. fig. 3.
—— blochii, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 81, or *Atl. Ichth.* v. p. 89, *Balist.* pl. 3. fig. 1; *Kner*, *Novara*, *Fische*, p. 394.
—— angustifrons, *Hollard*, *Ann. Sc. Nat.* 1854, i. p. 45, pl. 2. fig. 2.
—— macrurus, *Bleek. Atl. Ichth.* v. p. 91, *Balist.* pl. 8. fig. 3.

D. 5 | 22–25. A. 16–19.

The height of the body is contained from twice and one-half to thrice and one-fifth in the total length (without caudal). Snout produced, with the upper profile distinctly concave. The first dorsal spine as long as the head, and sometimes considerably longer; the second very short, not much longer than the third. Spinous dorsal fin with or without black spot.

East Indies; Australia.

a. Adult: skin. Pinang. From Dr. Cantor's Collection.
b. Adult. Java. From Dr. Bleeker's Collection.—Type of *T. macrurus*.
c. Adult. East-Indian archipelago. From Dr. Bleeker's Collection as *T. blochii*.

d. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *T. oxycephalus.*

e. Half-grown. Australia. Presented by Sir J. Richardson.

f. Adult: skin. Port Essington.—In this example, which is 8 inches long, the dorsal spine has a length of 3½ inches.

g, *h–k*. Adult (7 inches) and half-grown.

3. Triacanthus strigilifer.

Triacanthus strigilifer, *Cant. Mal. Fish.* p. 363, pl. 9; *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboyna*, viii. p. 97; or *Atl. Ichth.* v. p. 89, *Balist.* pl. 15. fig. 3.

—— longirostris, *Hollard, Ann. Sc. Nat.* 1854, i. p. 46, pl. 2. fig. 3.

D. 5 | 22. A. 16.

The height of the body is a little less than one-third of the total length (without caudal). Snout produced, with the upper profile concave. The first dorsal spine as long as or longer than the head; the second twice or thrice as long as the third. Scales considerably larger than in the other species, in which they are minute. Spinous dorsal without black spot.

East-Indian archipelago; China.

a. Adult: skin. Pinang. From Dr. Cantor's Collection.—Type of the species.

b, *c*. Adult and half-grown. Amboyna.

d. Half-grown. Philippine Islands. Presented by Prof. Peters.

e. Adult. China. Presented by Sir J. Richardson.

Second Group. BALISTINA.

4. BALISTES*.

Balistes, sp., *Artedi.*

Balistes, *Cuv. Règne An.*

---

* 1. Balistes jacksonianus, *Quoy & Gaim. Voy. Uran. Poiss.* p. 209.—Sydney.

2. —— adspersus, *Tschudi, Faun. Per. Pisc.* p. 31.—Huacho.—D. 3 | 24 A. 21.

3. —— gutturosus, *Hollard, Ann. Sc. Nat.* 1854, i. p. 63.—Bourbon.

4. —— elongatus, *Hollard, l. c.* p. 69.—Azores.

5. —— heteracanthus, *Bleek.* (*Act. Soc. Sc. Indo-Neerl.* vi. *New Guinea*, p. 22; *Atl. Ichth. Balist.* p. 117, pl. 218. fig. 1), is established from two young examples, 28 & 31 millims. long; like other young *Balistes*, they are rough, and the dorsal spine is armed with strong spinelets; they are probably the young of one of the species known (*B. cinereus*).

a. One of the typical specimens. Doreh. From Dr. Bleeker's Collection.

6. —— tæniopterus, *Poey, Mem. Cub.* ii. p. 326.—Cuba.—Known from a drawing.

7. —— nebulosus, *Poey, Mem. Cub.* ii. p. 328.—Cuba.

8. —— caprinus, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 94, pl. 16. fig. 3.—Canary Islands.—The insufficient description does not agree with the figure.

9. —— lima, *Benn. Proc. Comm. Zool. Soc.* i. p. 168.—Mauritius.

Balistapus, *Tiles. Mém. Ac. Sc. St. Pétersb.* vii.
Xenodon, *Rüppell.*
Erythrodon, *Rüppell.*
Pyrodon (*Rüpp.*), Melichthys (*Swains.*), Balistes *et* Balistapus, *Kaup.*
Leiurus (*Swains.*), Erythrodon, Melichthys *et* Balistes (with the subgen. Parabalistes, Pseudobalistes, Balistapus, Balistes, Canthidermis), *Bleek. Ned. Tyds. Dierk.* iii. p. 10.

Body compressed, covered with juxtaposed moveable scutes; some species with series of spines or tubercles on the side of the tail. Upper jaw with a double series of incisor-like teeth, eight in the outer, and six in the inner series; lower jaw with eight similar teeth in a single series. The first dorsal fin reduced to three spines, the anterior of which is by far the strongest. Ventral fins reduced to a simple osseous appendage. No barbel. Vertebræ 7/10. Branchiostegals six.

Tropical and subtropical seas.

On the anatomy, see Hollard, Ann. Sc. Nat. 1853, xx. pp. 71–111, pl. 1; Owen, Osteolog. Catal. i. p. 76.

The species may be subdivided thus:—

A. The free portion of the tail is depressed (*Liurus*), p. 212.
B. The free portion of the tail is compressed.
  1. Teeth white, uneven, more or less deeply notched: *Balistes.*
    a. A groove in front of the eye, below the nostrils.
      α. Cheeks entirely scaly.
        aa. No osseous scutes behind the gill-opening (*Canthidermis*), p. 213.
        bb. Osseous scutes behind the gill-opening.
          αα. Tail without spines or tubercles, p. 215.
          ββ. Tail with recurved spines or well-developed tubercles, p. 218.
      β. Cheeks with naked grooves or stripes (*Parabalistes*), p. 221.
    b. No groove in front of the eye, p. 223.
  2. Teeth white, even, incisor-like (*Melanichthys*), p. 227.
  3. Teeth brownish red, the lateral upper pair much projecting * (*Erythrodon*), p. 228.

A. *The free portion of the tail is depressed*: Liurus.

1. **Balistes stellatus.**

Willughby, Append. p. 1, tab. 1. fig. 1; *Valent.* fig. 202; *Renard,* ii. tab. 33. fig. 153; *Ruysch, Amb.* tab. 2. fig. 8.
Balistes stellatus, *Lacép.* i. p. 350, pl. 15. fig. 1; *Rüpp. Atl. Fish.* p. 31; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 13.

---

* This peculiar form of the dentition cannot be used as a generic character by itself, as it is observed also in other species, although in a less degree.

Balistes stellaris, *Bl. Schn.* p. 476; *Hollard, Ann. Sc. Nat.* 1854, i. p. 320.
—— vachellii, *Richards. Voy. Sulph. Fish.* p. 129.
—— phaleratus, *Richards. in Stokes, Discov. in Austral.* i. p. 484, pl. 1. figs. 4–5.
Leiurus stellatus, *Bleek. Atl. Ichth. Balist.* p. 105, pl. 1; *Kner, Novara, Fisch.* p. 398.

D. 3 | 27. A. 25. L. lat. 44.

Tail depressed behind, with two obtuse ridges on each side. Twenty-four scales in a transverse series running from the origin of the soft dorsal fin to the vent. A patch of enlarged scales behind the gill-opening. Dorsal and anal fins not elevated; caudal fins with the posterior margin undulated, and with the lobes produced into long filaments (in the adult). Ventral spine moveable. Adult examples with but a few distinct markings, viz. a whitish band along the middle of the trunk, and dark longitudinal stripes on the dorsal and anal fins. In young examples there are four large white spots on the back—the first between the eye and dorsal spine, the second between the dorsal fins, and the last on the tail. The body, besides, is ornamented with more or less irregular bluish spots. In very young examples the white dorsal spots are very distinct, the ground-colour of the back being a deep brown.

Indian and Pacific Oceans.

a. Young. Red Sea.
b, *c*. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
d–f. Half-grown and young: skins. Zanzibar. Presented by Lieut.-Col. Playfair.
g–h. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
i. Adult: skin. Ceylon. From Dr. Kelaart's Collection.
k. Young. Singapore.
l. Young. Amboyna. Purchased of Hr. Frank.
m. Very young. China Seas. Presented by Vice-Admiral Sir E. Belcher.
n. Very young. West Australia.—Type of *B. phaleratus*.
o–p. Adult (19 inches long): stuffed. Hope Island (North-east Australia).
q–r. Adult: stuffed. Louisiade archipelago. Voyage of the 'Rattlesnake.'
s. Half-grown: stuffed.

B. *The free portion of the tail is compressed.*

1. *Teeth white, uneven, more or less deeply notched*: Balistes.

a. *A groove in front of the eye, below the nostrils.*

a. *Cheeks entirely scaly.*

aa. *No osseous scutes behind the gill-opening.*

2. Balistes maculatus.

Guaperva longa, *Willughby, Append.* p. 21, tab. I. 20.
Sabaco, *Parra*, p. 17, lam. 10.

Balistes maculatus, *Gm. L.* i. p. 1468; *Bl.* ii. p. 25, tab. 151; *Bl. Schn.* p. 464; *Lacép.* i. p. 361; *Hollard, Ann. Sc. Nat.* i. 1854, p. 158.
—— sufflamen, *Mitch. Lit. & Phil. Trans. N. York*, i. p. 467, pl. 6. fig. 2.
—— oculatus, *Gray, Ill. Ind. Zool.*
—— willughbeii, *Benn. Proc. Comm. Zool. Soc.* i. p. 168; and in *Beechey's Voy. Zool.* p. 68, pl. 21. fig. 2.
? Balistes angulosus, *Quoy & Gaim. Voy. Uran. Zool.* p. 210; *Hollard, l. c.* p. 57.
Balistes azureus, *Less. Voy. Coq. Zool.* ii. p. 121, pl. 10. fig. 2.
? Balistes rotundatus, *Procé, Bull. Soc. Philom.* 1822, p. 130.
Balistes conspicillum, *Cant. Mal. Fish.* p. 344 (not syn.).
—— longus, *Gronov. Syst.* ed. *Gray*, p. 37.
—— senticosus, *Richards. Voy. Samar. Fish.* p. 23, pl. 9. figs. 5–8; *Bleek. Nat. T. N. Ind.* v. p. 93.
—— longissimus, *Hollard, Ann. Sc. Nat.* i. p. 60, pl. 3. fig. 3.
—— brevissimus, *Hollard, Ann. Sc. Nat.* 1854, i. p. 56, pl. 3. fig. 1.
—— (Canthidermis) oculatus, *Bleek. Atl. Ichth. Balist.* p. 121, pl. 4. fig. 2.
—— (Canthidermis) maculatus, *Bleek. l. c.* p. 122, fig. 4; *Kner, Novara, Fisch.* p. 401.
—— sobaco, *Poey, Mem. Cub.* ii. p. 324.
—— macrops, *Poey, l. c.* p. 326.

D. 3 | 26. A. 24. L. lat. 55–56.

Tail without spines or tubercles; but the scales are very conspicuously granulated and provided with a larger prickle at the base, which is prominent in young examples, but disappears more or less with age. From thirty-one to thirty-nine scales in a transverse series running from the origin of the dorsal fin to the vent. No enlarged scales behind the gill-opening. The anterior parts of the dorsal and anal fins are much elevated, more so in adult than in young examples. Caudal subtruncate. Ventral spine short, sometimes anchylosed with the pelvic bone. Brown, with round or ovate whitish spots. In young examples these spots are more indistinct, and mixed with darker spots of the same size, and pure white dots. Sometimes uniform brown or uniform deep black.

Tropical and subtropical parts of the Atlantic and Indian Oceans, extending into the Pacific. Occasionally on the British coast.

a. Half-grown: stuffed. Polperro. Purchased.
b. Young. Fernando Po. From Mr. Fraser's Collection.
c. Adult: skin. Jamaica. Purchased of Mr. Parnell.
d. Half-grown: skin. West Indies.
e. Young. West Indies. From the Haslar Collection.
f–g. Young. Cape of Good Hope.
h. Young. Pinang. From Dr. Cantor's Collection.
i–o. Young: skins. Pinang. From Dr. Cantor's Collection.
p–q. Young. Borneo.
r. Young: stuffed. Sandelwood Island. Presented by F. M. Rayner, Esq. Entirely black.
s–t. Young: skins. India. Presented by T. E. J. Boileau, Esq.

u. Young. China Seas. Presented by Sir J. Richardson.—Type of *B. senticosus*.
v. Young. Japan.
w, x, y, z, α, β. Young examples.
γ. Several adult (16 inches) and half-grown specimens: stuffed.

3. Balistes aureolus.

Balistes aureolus, *Richards. Voy. Sulph. Fish.* p. 126, pl. 59. figs. 1, 2.

D. 3 | 28. A. 25. L. lat. 44.

Tail without spines or tubercles, but with indistinct raised lines along the series of scales. No enlarged scales behind the gill-opening. Dorsal and anal fins not elevated, caudal truncated. Ventral spine not moveable, short. Uniform brownish above, sides shining golden; fins without colour. Dorsal spine of young examples (1 inch) with recurved spinelets.

East Indies?

a–b. Types of the species, 3 inches long. Presented by Vice-Admiral Sir E. Belcher.
c, d, e, f, g. Many examples, 1–3 inches long.

bb. *Osseous scutes behind the gill-opening.*

aa. *Tail without spines or tubercles.*

4. Balistes vetula.

Guaperva, *Marcgr.* pp. 163, 164; *Willughby, App.* p. 21, tab. J. 23. *Catesby, Carol.* ii. p. 22, tab. 22; *Seba,* iii. pl. 24. f. 14; *Parra,* p. 15, lam. 9.
Balistes, sp. no. 1, *Artedi, Gen.* p. 53, and *Synon.* p. 82; *Gronov. Zoophyl.* no. 195.
Balistes vetula, *L. Syst. Nat.* i. p. 406; *Osbeck, Iter,* p. 294; *Bl.* tab. 150; *Bl. Schn.* p. 470; *Lacép.* i. p. 337; *Less. Voy. Coq. Zool.* ii. p. 113, pl. 9. fig. 2; *Jenyns, Voy. Beagle, Fish.* p. 155; *Hollard, Ann. Sc. Nat.* 1854, i. p. 305.
—— equestris, *Gronov. l. c.* p. 31.
Skull and dentition: *Owen, Osteol. Catal.* i. p. 76 (B. forcipatus).

D. 3 | 30–32. A. 29. L. lat. 63.

Tail without spines or tubercles. Thirty-seven scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of enlarged osseous plates behind the gill-opening. In mature examples the anterior dorsal rays and the caudal lobes are produced into long filaments; in young, the dorsal and anal fins are elevated, but without being produced. Ventral spine moveable. Two curved bluish dark-edged bands on the side of the head, the lower from the angle of the mouth towards the throat; the upper is broader, running from above the snout to the root of the pectoral. A black, light-edged line, similarly curved below the eye; several other similar lines radiating from the eye. Caudal fin with an upper and lower bluish margin, and with an intramarginal posterior bluish band. Dorsal and anal fins with bluish transverse bands. Young examples with some irregular oblique black lines following the series of the scales.

Tropical parts of the Atlantic, especially in the American parts; rare in the East Indies.

a–b. Half-grown. Bahia. From Dr. Wucherer's Collection.
c. Half-grown: stuffed. Bahia.
d–e. Adult and half-grown. St. Croix. Purchased of Mr. Stevens.
f–i. Adult and young: skins. Jamaica.
k–l. Adult (16 inches long, without caudal filament). West Indies.
m–n. Half-grown: skins. West Indies.
o–p. Adult: skins. Cape of Good Hope.
q. Adult. Amboyna. From Madame Ida Pfeiffer's Collection.
r. Half-grown: skin. India. Presented by G. R. Waterhouse, Esq.
s–w. Adult (18 inches long, without caudal filament) and half-grown: stuffed.
x–z. Young.
α. Half-grown: skin. From Gronow's Collection.
β. Adult: skeleton. Purchased.

5. Balistes forcipatus.

Stip-visch, *Nieuhof, Braz. Lant- en Zee-R.* ii. p. 275 (c. fig. bona); *Willughby, Append.* p. 21, tab. J. 22.
Balistes forcipatus, *Gm. L.* i. p. 1472; *Hollard, Ann. Sc. Nat.* i. 1854, p. 307.
—— punctatus, *Gm. L. l. c.*
—— ciliaris, *Bl. Schn.* p. 471.

D. 3 | 28. A. 25. L. lat. 60.

Tail with scarcely a trace of minute tubercles. Forty-three scales in a transverse series running from the origin of the soft dorsal fin to the vent. A patch of enlarged osseous plates behind the gill-opening. About four of the anterior dorsal rays are produced into long filaments; and also the upper and lower caudal lobes are produced. Side of the head with curved blue lines, which are more or less broken up into series of spots. Bluish lines radiate also from the eye. Body and dorsal and anal fins with numerous small blackish-brown spots. A large patch, without spots, on the side of the trunk behind the gill-opening.

Tropical and subtropical parts of the Atlantic.

a. Fine specimen, 17 inches long. Cape Verde Islands. Presented by the Rev. R. T. Lowe.
b. Adult: skin. Fernando Po. Purchased.
c. Adult. West Africa. Purchased of Mr. Dalton.
d. Adult: skeleton. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

6. Balistes vidua.

Renard, i. pl. 17. fig. 96.

Balistes vidua, *Richards. Voy. Sulph. Fish.* p. 128, pl. 59. figs. 9, 10; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 565; *Hollard, Ann. Sc. Nat.* 1854, i. p. 319.

Melichthys vidua, *Bleek. Atl. Ichth.* v. p. 109, pl. 217. fig. 2.

D. 3 | 34. A. 30. L. lat. 60.

Tail without spines or tubercles. About thirty-two scales in a transverse series running from the origin of the soft dorsal fin to the vent. A patch of enlarged scales behind the gill-opening. Dorsal and anal fins rather elevated; caudal truncated. Dark-brown, end of the tail and caudal whitish; dorsal and anal fins with black margins.

Indian archipelago and Pacific.

a. Adult: bleached. Otaheiti. Old Collection. Probably from Cook's voyage, and type of the species.

b, *c*. Adult. China. Presented by Sir J. Richardson.

d. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.

7. Balistes capriscus.

Seba, iii. 24. 16.

Capriscus, *Salv.* fol. 206 B; *Willughby*, p. 152, tab. J. 19.

Balistes, sp., *Gronov. Zoophyl.* no. 187.

Balistes capriscus, *Gm. L.* i. p. 1471; *Bl. Schn.* p. 476; *Lacép.* i. p. 372, pl. 13. fig. 3; *Jenyns, Man.* p. 492; *Yarr. Brit. Fish.* 2nd edit. ii. p. 472, and 3rd edit. ii. p. 422; *Risso, Ichth. Nice*, p. 51; *Gronov. Syst.* ed. *Gray*, p. 30; *Hollard, Ann. Sc. Nat.* 1854, i. p. 309; *Costa, Faun. Regn. Napol. Pesce*, tab. 61, 62.

—— lunulatus, *Risso, Eur. Mérid.* iii. p. 175.

File-fish, *Shaw, Zool.* v. pt. 2. p. 411, pl. 168*; *Couch, Hist. Brit. Fish.* iv. p. 369, pl. 243.

Balistes carolinensis, *Gronov. Syst.* ed. *Gray*, p. 29.

—— fuliginosus, *Dekay, New York Fauna, Fish.* p. 339, pl. 57. fig. 188.

—— castaneus, *Richards. Voy. Sulph. Fish.* p. 126, pl. 59. figs. 5, 6.

D. 3 | 28. A. 24–25. L. lat. 62.

Tail without spines or tubercles, but with a rudimentary lateral line. About thirty-two scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of enlarged scales behind the gill-opening. Anterior parts of the dorsal and anal fins rather elevated; caudal lobes produced in old examples. Ventral spine moveable. Dried examples uniform brownish; a young example with numerous small dark-brown spots.

Mediterranean; occasionally on the British coast; Pacific.

a. Adult: stuffed (14 inches long, without caudal filaments). Cornwall. Presented by J. Couch, Esq.

b–c. Half-grown: skins. Great Britain?

d. Half-grown: stuffed. From the Collection of the Zoological Society.

e, *f–g*. Half-grown. Mediterranean. Purchased.

h. Half-grown. Madeira. Presented by J. Y. Johnson, Esq.

- *i*. Young. Pacific. Presented by Sir J. Richardson.—Type of *B. castaneus*.
- *k*. Half-grown. Panama. Presented by Capt. Dow.—In this example the snout is partly naked.
- *l*. Adult: skin. From Gronow's Collection.—Type of *B. carolinensis*.
- *m*. Young: skin. From Gronow's Collection.—Type of *B. capriscus*.

ββ. Tail with recurved spines or well-developed tubercles.

8. **Balistes niger.**

Balistes niger, *Mungo Park, Trans. Linn. Soc.* iii. p. 37; *Bl. Schn.* p. 471.
Baliste armé, *Lacép.* i. pp. 336, 382, pl. 18. fig. 2.
Balistes chrysopterus, *Bl. Schn.* p. 466.
—— subarmatus, *Gray, Ill. Ind. Zool.*
—— albicaudatus, *Rüpp. N. W. Fische*, p. 54, pl. 16. fig. 1.
—— verrucosus, *Gronov. Syst.* ed. *Gray*, p. 33.
—— armatus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 16.
—— (Balistapus) armatus, *Bleek. Ned. Tyds. Dierk.* iii. p. 23, and *Atl. Ichth.* v. p. 115, pl. 216. fig. 1; *Hollard, Ann. Sc. Nat.* i. 1854, p. 328.

D. 3 | 26. A. 23. L. lat. 47.

Tail with six or seven series of rather small recurved spines. About twenty-six scales in a transverse series running from the origin of the soft dorsal fin to the vent. Some enlarged osseous scutes behind the gill-opening. Dorsal and anal fins rather low. Caudal truncate. Brownish black; caudal with white margins; a light ring round the lower jaw.

Indian Ocean and archipelago.

- *a*. Half-grown: stuffed. Red Sea. From Dr. Rüppell's Collection.
- *b*. Several adult and half-grown specimens: in spirits and skins. Zanzibar. Presented by Lieut.-Col. Playfair.
- *c*. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
- *d*. Half-grown: skin. Ceylon. From Dr. Kelaart's Collection.
- *e*. Adult: skin. Sumatra. From Mungo Park's Collection.—Type of the species.
- *f*. Adult. Amboyna. Purchased of Hr. Frank.
- *g*. Adult: stuffed. Aneiteum. Collected by Mr. McGillivray.
- *h*. Adult. Micronesia. Purchased of Mr. Wright.
- *i*. Adult: skin. From Gronow's Collection.
- *k*. Adult. Purchased of Mr. Brandt.
- *l*. Adult: skeleton. Zanzibar. Presented by Lieut.-Col. Playfair.

9. **Balistes mitis.**

Baliste bridé, *Lacép.* i. pp. 335, 381, pl. 15. fig. 3.
Balistes amboinensis, *Gray, Ill. Ind. Zool.* c. fig.
—— mitis, *Benn. Proc. Comm. Zool. Soc.* i. p. 169.
—— frenatus, *Richards. Voy. Sulph. Fish.* p. 129, pl. 60. fig. 1; *Hollard, Ann. Sc. Nat.* 4^e^ série, i. p. 322, pl. 5. fig. 3; *Bleek. Act. Soc. Sc. Indo-Neerl.* i. *Manado*, p. 74.

Balistes hihpe, *Richards. l. c.* p. 127, pl. 60. fig. 2.
—— schmittii, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 37.
—— (Balistapus) frenatus, *Bleek. Atl. Ichth. Balist.* p. 114, pl. 223. fig. 2; *Kner, Novara, Fisch.* p. 400.

D. 3 | 30–31. A. 27–28. L. lat. 54–64.

Each scale on the tail with a small and rather smooth tubercle. About thirty-four scales in a transverse series running from the origin of the soft dorsal fin to the vent. Some enlarged osseous scutes behind the gill-opening. Dorsal and anal fins rather low; caudal truncate. Uniform blackish brown; a yellowish ring round the lower jaw, at a short distance from the lip. A straight yellow stripe runs from this ring towards the root of the pectoral, which it does not reach; it is sometimes absent.

Indian and Pacific Oceans.

a. Adult. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Adult: stuffed. Zanzibar. From Col. Playfair's Collection.
c. Adult. Port Natal. Purchased of Mr. Th. Ayres.
d. Adult: stuffed. Mauritius. From Dr. Jauvier's Collection.
e, f. Adult and half-grown. Mauritius. From the Collection of the Zoological Society.—Types of the species.
g. Adult, 16 inches long. India. Presented by Mr. Boileau.
h. Adult and half-grown. China. Presented by J. R. Reeves, Esq.
i. Adult and half-grown. Observatory Island (Bellona's). Presented by F. M. Rayner, Esq.
k. Adult. Gonzalez Island. Presented by Capt. Dow.
l. Half-grown: stuffed. From the Collection of the Zoological Society.

10. Balistes bursa.

Valent. figs. 377 & 403; *Renard*, i. tab. 1. fig. 7, ii. tab. 26. fig. 127; *Ruysch*, tab. 19. figs. 5 & 6.
Baliste bourse, *Lacép.* i. pp. 335, 375.
Balistes bursa, *Bl. Schn.* p. 476; *Bleek. Nat. Tyds. Ned. Ind.* v. p. 350; *Hollard, Ann. Sc. Nat.* 1854, i. p. 328.
Balistes (Balistapus) bursa, *Bleek. Atl. Ichth. Balist.* p. 116, pl. 9. fig. 3.

D. 3 | 28–29. A. 25–27. L. lat. 50.

Each scale on the tail and posterior part of the trunk with some spinous tubercles, which change into recurved spines posteriorly. The tubercles and spines form an elevated line along each series of scales. About twenty-five scales in a transverse series running from the origin of the soft dorsal fin to the vent. A patch of enlarged osseous scutes behind the gill-opening. Dorsal and anal fins not elevated; caudal fin subtruncate. Ventral spine moveable. Brownish olive, with a fine yellowish line from the angle of the mouth to the vent, where it forms an edge to a black spot covering the vent and ventral spine. Sometimes this line stops below the pectoral fin. A vertical crescent-shaped black band across the posterior margin of the orbit to the root of the pectoral fin; another similar band across the postbranchial region.

Indian and Pacific Oceans.

a–b. Adult: skins, in spirit. Africa.
c. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
d, e, f. Fine specimens. Amboyna.
g. Adult (7 inches): skins. Sandwich Islands. Purchased of Mr. Damon.

11. Balistes conspicillum.

Valent. figs. 142 & 408; *Renard*, i. tab. 15. fig. 88, ii. tab. 28. fig. 138; *Ruysch, Amb.* tab. 9. fig. 3.
Balistes americanus (? *Gm. L.* i. p. 1473): *Lacép.* i. p. 375, pl. 16. fig. 2.
—— conspicillum, *Bl. Schn.* p. 474; *Less. Voy. Coq. Zool.* ii. p. 112, pl. 9. fig. 1; *Cant. Mal. Fish.* p. 344; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 780; *Schleg. Faun. Japon. Poiss.* p. 289, pl. 129. fig. 1; *Hollard, Ann. Sc. Nat.* 1854, i. p. 326.
—— bicolor, *Shaw, Zool.* v. pt. 2. p. 407.
—— (Balistapus) conspicillum, *Bleek. Atl. Ichth. Balist.* p. 116, pl. 7. fig. 2; *Kner, Novara, Fisch.* p. 400.

D. 3 | 25–26. A. 21–22. L. lat. 46.

Tail with two and a half series of conspicuous tubercles. About twenty-nine scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of enlarged scales behind the gill-opening. Dorsal and anal fins rather low; caudal fin subtruncate. Ventral spine very short, moveable. Brownish black, with very large round white spots on its lower half. Back between the dorsal fins of a lighter coloration, the centre of each scale being brown. A white band across the back of the snout, from one eye to the other. Extremity of the snout white, and with a narrow white ring. Caudal fin white, with a broad brown band across the base, and with black margin.

Indian and Pacific Oceans.

a–b. Adult: stuffed (12–13 inches long).
c. Adult: stuffed. Japan. Purchased of Hr. Frank.
d. Fine specimen. Formosa. From Consul Swinhoe's Collection.

12. Balistes viridescens.

Baliste verdâtre, *Lacép.* i. pp. 335, 378, pl. 16. fig. 3.
Balistes viridescens, *Bl. Schn.* p. 477: *Rüpp. Atl. Fisch.* p. 30; *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 375; *Hollard, Ann. Sc. Nat.* 1854, i. p. 324.
—— (Pseudobalistes) viridescens, *Bleek. Atl. Ichth. Balist.* p. 112, pl. 17. fig. 2.

D. 3 | 24–25. A. 23. L. lat. 29.

Tail with four and a half series of recurved spines. Snout scaly to the lips, without naked or tubercular spaces, with the exception of the fold behind the angle of the mouth. About eighteen scales in a transverse series running from the origin of the soft dorsal fin to the vent. A few small osseous scutes behind the gill-opening. Dorsal and anal fins slightly elevated; caudal fin subtruncate or rounded. Ventral spine short. Nearly uniform brownish, or brownish olive; an indistinct blackish band between the eye and the root of the pectoral fin. Scales generally with the centre darker. Posterior margin of the caudal fin blackish.

Indian Ocean and archipelago.

a. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.
b. Half-grown: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Adult (20 inches): stuffed. Mauritius. From Dr. Janvier's Collection.

β. Cheeks with naked grooves or stripes.

13. Balistes ringens.

Cocuyo, *Parra*, p. 19, lam. 11. fig. 2.
Balistes, sp., *Gronov. Zoophyl.* nos. 190 & 196.
Balistes ringens, *L. Syst. Nat.* i. p. 407.
—— curassavicus, *Gm. L.* i. p. 1472; *Bl. Schn.* p. 475.
—— notatus, *Gronov. Syst.* ed. *Gray*, p. 36.
—— nitidus, *Gronov. l. c.* (young).
—— lineo-punctatus, *Hollard, Ann. Sc. Nat.* 1854, i. p. 65.
—— cicatricosus, *Poey, Mem. Cub.* ii. p. 327; and *Proc. Acad. Nat. Sc. Philad.* 1863, p. 181.

D. 2 | 29. A. 27. L. lat. 38.

Tail without spines or tubercles. Eighteen scales in a transverse series running from the origin of the dorsal fin to the vent. No enlarged plates behind the gill-opening. Teeth deeply notched, but the front teeth do not much project beyond the line of the other teeth. Cheeks with three very distinct naked, narrow, blackish longitudinal grooves. Anterior dorsal and anal rays and caudal lobes but slightly produced. Ventral spine moveable. Each scale with a blackish spot at the base; the spots confluent into narrow longitudinal lines in examples from Mauritius.

West Indies; Mauritius.

a. Seven and a half inches long: stuffed. Mauritius. From Dr. Janvier's Collection.
b. Eight inches long: skin. Jamaica. Purchased of Mr. Parnell.
c. Adult. Cuba. From the Collection of the Zoological Society.
d. Adult: skin. From Gronow's Collection.—Type of *B. notatus*.
e. Young: skin. From Gronow's Collection.—Type of *B. nitidus*.
f. Fine specimen, 9½ inches long. Voyage of the 'Herald.'

14. Balistes auromarginatus.

Balistes auromarginatus, *Benn. Proc. Comm. Zool. Soc.* i. p. 168.
—— calolepis, *Hollard, Ann. Sc. Nat.* i. 1854, p. 67, pl. 3. fig. 5.

D. 3 | 28. A. 25. L. lat. 43.

Each scale on the tail and hind part of the trunk with a rough keel. Twenty scales in a transverse series running from the origin of the soft dorsal fin to the vent. No enlarged plates behind the gill-opening. The scales on the cheek are separated by naked longitudinal grooves. Anterior dorsal and anal rays and caudal lobes but slightly produced. Each scale on the tail and lower half of the trunk with a pearl-coloured spot. Dorsal, anal, and caudal fins with whitish margins.

Mauritius.

a. Type of the species. Mauritius. From the Collection of the Zoological Society.
b. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
c. Adult: stuffed.

15. **Balistes rivulatus.**

Rüppell, N. W. Fische, p. 56, taf. 16. fig. 2.

D. 3 | 26. A. 23.

Tail without any spines or tubercles. Six naked stripes on the cheek. Dorsal and anal fins somewhat elevated, with the profile rounded; caudal fin with the lobes slightly produced. Yellowish, with bluish stripes, oblique on the head and longitudinal on the body; a band between the eyes, a semicircular spot on the base of the first and second dorsal fins, the first dorsal fin, and a ring round the tail black. Fins with blue spots and whitish margins. (*Rüpp.*).

Djedda.

16. **Balistes fuscus.**

Baliste grande-tache, *Lacép.* i. p. 378.
Balistes fuscus, *Bl. Schn.* p. 471.
—— signatus, *Shaw, Zool.* v. pt. 2. p. 416.
—— cærulescens, *Rüpp. Atl. Fisch.* p. 32, taf. 7. fig. 2.
—— reticulatus, *Hollard, Ann. Sc. Nat.* i. 1854, p. 312.
—— chrysospilus, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 94, or *Atlas Ichth. Balist.* p. 111, pl. 11. fig. 3.

D. 3 | 25. A. 23. L. lat. 43–55.

Tail without spines or tubercles. From twenty-seven to thirty-one scales in a transverse series running from the origin of the soft dorsal fin to the vent. A patch of enlarged osseous plates behind the gill-opening. The greater portion of the cheek is naked, longitudinally traversed by five or six lines of small tubercles. Dorsal and anal fins elevated; caudal lobes produced into long filaments (in the adult). Ventral spine short, moveable. Vertical fins with a white margin. Body with brownish vermiculated or reticulated lines; the lines form sometimes a meshwork, enclosing round yellow spots, smaller than the eye. Very old examples uniform brown, with white margins to the fins.

Indian Ocean and archipelago.

a. Young: stuffed. Red Sea. From Dr. Rüppell's Collection.
b. Nineteen inches long: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
d. Adult. From Dr. Bleeker's Collection.—Type of *B. chrysospilus*.

17. Balistes flavimarginatus.

Balistes flavimarginatus, *Rüpp. Atl. Fisch.* p. 33, and *N. W. Fisch.* p. 54, taf. 15. figs. 1–2; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 303.
—— beeri, *Bleek. Act. Soc. Sc. Indo-Neerl.* v. *Celebes,* xiii. p. 53.
—— (Pseudobalistes) flavomarginatus, *Bleek. Atl. Ichth. Balist.* p. 113, pl. 4. fig. 3, pl. 10. fig. 3. (The scales on the snout are not correctly drawn.)

D. 3 | 26. A. 23–24. L. lat. 35.

Tail with from four to six series of rather small recurved spines. Front part of the snout partly naked and partly covered with small rudimentary tubercle-like scales only; also the cheeks are not entirely covered by the scales in adult examples. About twenty scales in a transverse series running from the origin of the dorsal fin to the vent. A few small osseous scutes behind the gill-opening. Dorsal and anal fins somewhat elevated; caudal fin rounded in very young, truncate in half-grown, and deeply emarginate with produced lobes in adult examples. Ventral spine short, moveable. Old examples of a nearly uniform coloration; young with black or blackish spots, confined to the centre of the scales or scattered over the body. Vertical fins with a blackish and whitish margin.

Indian Ocean and archipelago.

a–b. Adult and half-grown: stuffed. Red Sea. From Dr. Rüppell's Collection.
c–d. Half-grown and young. Amboyna.
e–f. Adult (23 inches) and young: stuffed. From the Collection of the Zoological Society.

b. *No groove in front of the eye.*

18. Balistes aculeatus.

Seba, iii. tab. 24. fig. 15; *Valent.* figs. 22 & 422; *Renard,* i. t. 28. f. 154, ii. t. 28. f. 136; *Ruysch,* t. 2. f. 2, t. 19. f. 8.
Balistes, sp., *Gronov. Zoophyl.* no. 188, or *Mus. Ichth.* i. p. 53. no. 117.
Capriscus, sp., *Klein, Pisc. Miss.* iii. p. 25. no. 7, tab. 3. fig. 10.
Balistes aculeatus, *L. Syst. Nat.* i. p. 406; *Bl.* ii. p. 19, tab. 149; *Bl. Schn.* p. 465; *Lacép.* i. p. 367, pl. 17. fig. 1; *Bennett, in Beechey's Voy. Zool.* p. 69, pl. 22. fig. 2; *Jenyns, Zool. Beagle, Fish.* p. 155; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 15; *Hollard, Ann. Sc. Nat.* i. 1854, p. 333.
—— ornatissimus, *Less. Voy. Coq. Zool. Poiss.* i. p. 119, pl. 10. fig. 1.
—— armatus, *Cuv. R. An. Ill. Poiss.* pl. 112. fig. 2.
—— striatus, *Gronov. Syst.* ed. *Gray,* p. 32.
—— (Balistapus) aculeatus, *Bleek. Atl. Ichth. Balist.* p. 120, pl. 2. fig. 3.

D. 3 | 25. A. 22. L. lat. 40.

Tail with two and a half series of recurved spines. Twenty-three scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of enlarged osseous plates behind the gill-opening. Dorsal and anal fins rather low, with rounded profile; caudal fin with the margin undulated in adult and rounded in young examples. Ventral spine moveable. Sides blackish, with two pairs of oblique whitish or yellowish bands, descending from the middle of the side to the anal fin. A broad black cross band between the eyes, sometimes transversely divided by bluish bands. Three blue vertical lines from the eye to the root of the pectoral. Base of the caudal spines black. A brownish or dull orange band, inferiorly lined with blue, runs from the angle of the mouth to the pectoral. Fins immaculate.

From the West Coast of Africa to the Pacific.

a. Adult (10 inches long). Isle of France.
b. Half-grown: dried. Island of Johanna. Presented by Dr. Kirk.
c–d. Adult and half-grown: skins. Zanzibar. From Lieut.-Col. Playfair's Collection.
e, f. Adult and half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.
g. Very young. West Coast of Africa.
h. Adult. Moluccas.
i. Adult. Amboyna. Purchased of Hr. Frank.
k, l, m–p. Adult and young. China Seas.
q–s. Adult and half-grown. Pacific. From the Haslar Collection.
t. Adult: stuffed. Feejee Islands.
u. Adult. Micronesia. Purchased of Mr. Wright.
v. Adult: skeleton. Seychelles. From Prof. E. P. Wright's Collection.
w. Adult: skeleton. Mauritius.

19. **Balistes assasi.**

Balistes assasi, *Forsk. Descr. An.* p. 75; *Gm. L.* i. p. 1471; *Rüpp. N. W. Fisch.* p. 53; *Hollard, Ann. Sc. Nat.* 1854, i. p. 331.
—— aculeatus, *Rüpp. Atl.* p. 27, taf. 7. fig. 1.

D. 3 | 25. A. 22. L. lat. 40.

Tail with three narrow bands of recurved spines. Twenty-three scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of enlarged osseous plates behind the gill-opening. Dorsal and anal fins rather low, with rounded profile; caudal fin convex or subtruncated. Ventral spine moveable. A narrow brown streak runs from the angle of the mouth to the root of the pectoral fin. Four blue cross bands between the eyes, alternating with three black. A black vertical band descends from the eye to the pectoral fin; it is accompanied by a yellow band in front, and both are separated from each other and edged with blue. A large ovate white patch on each side of the tail, traversed by the black bands of spines.

Red Sea.

a, b, c–e. Adult and half-grown. Red Sea.
f. Adult: stuffed. Red Sea.

20. Balistes verrucosus.

Valent. fig. 173; *Renard*, ii. tab. 34. fig. 157; *Ruysch*, *Amb.* tab. 14. fig. 14; *Seba*, iii. t. 24. f. 17.
? Balistes verrucosus, *L. Syst. Nat.* i. p. 405.
Baliste pralin, *Lacép.* i. p. 363.
Balistes viridis, *Bl. Schn.* p. 476.
—— verrucosus, *Bl. Schn.* p. 465.
—— unimaculatus, *Shaw*, *Zool.* v. pt. 2. p. 410.
—— praslinensis, *Quoy & Gaim. Voy. Uran. Zool.* p. 205, pl. 46. fig. 1.
—— praslinoides, *Less. Voy. Coq. Zool.* ii. p. 117, pl. 9. fig. 3.
—— melanopleura, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 14.
—— praslensis, *Hollard*, *Ann. Sc. Nat.* 1854, i. p. 332.
—— (Balistapus) verrucosus, *Bleek. Atl. Ichth. Balist.* p. 120, pl. 2. fig. 2; *Kner*, *Novara*, *Fisch.* p. 399.

D. 3 | 24–26. A. 21. L. lat. 43.

Tail with two and a half, three, or three and a half series of recurved spines. Twenty-four scales in a transverse series running from the origin of the dorsal fin to the vent. A patch of large osseous plates behind the gill-opening. Dorsal and anal fins rather low, with rounded profile; margin of caudal fin slightly rounded. Ventral spine moveable. *A very large black blotch on the side, below the lateral line.* An indistinct light longitudinal band above it, commencing from the gill-opening. A black band across the forehead, and vertically descending to the root of the pectoral fin; it is accompanied by four blue lines above the eye and by three below it. A triangular (whitish) spot behind the angle of the mouth, tapering into a line which divides the dark colour of the upperside of the head from the light colour of the lower parts. Roots of the caudal spines black. Fins immaculate.

Indian Ocean and archipelago; New Ireland.

a. Adult (9 inches): stuffed. Mauritius. From Dr. Janvier's Collection.
b. Adult: skin. Sumatra. From Mungo Park's Collection.
c–d. Adult and young. Amboyna.
e. Half-grown. Celebes.
f. Young. Philippine Islands. From Mr. Cuming's Collection.
g, *h–i*. Adult.
k. Adult: stuffed.
l. Adult: skeleton. Amboyna. Purchased of Hr. Frank.

21. Balistes rectangulus.

Baliste écharpe, *Lacép.* i. pp. 333, 352, pl. 16. fig. 1.
Balistes rectangulus, *Bl. Schn.* p. 465; *Günth. in Fish. Zanz.* p. 134.
—— medinilla, *Quoy & Gaim. Voy. Uran. Poiss.* pl. 46. fig. 2.
—— erythropteron, *Less. Voy. Coq. Zool.* ii. p. 123, pl. 10. fig. 3.
—— cinctus, *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboina*, viii. p. 96; *Hollard*, *Ann. Sc. Nat.* 1854, i. p. 335.
—— (Balistapus) cinctus, *Bleek. Ned. Tyds. Dierk.* iii. p. 24, and *Atl. Ichth.* v. p. 119, pl. 228. fig. 1.

D. 3 | 23. A. 20–21. L. lat. 42.

Tail with three and a half series of recurved spines. About twenty-eight scales in a transverse series running from the origin of the dorsal fin to the vent. Some enlarged osseous scutes behind the gill-opening. Dorsal and anal fins rather low, with rounded profile; caudal fin slightly convex. Ventral spine moveable. Light brownish olive; a black band between the eyes, continued towards the vent, becoming broader below, where it extends from the fourteenth anal ray to the front of the vent. A black cuneiform spot on each side of the tail, pointed in front. A black longitudinal line runs from the post-branchial region towards the end of the soft dorsal. A black vertical line from the front of the eye.

Indian Ocean and archipelago; Polynesia.

a. Adult: skin. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
c, *d*. Adult (7 inches long).
e. Adult: stuffed.

22. Balistes cinereus.

Baliste cendré, *Lacép.* i. pp. 336, 384, pl. 17. fig. 2.
Balistes cinereus, *Bonnat. Encycl. Ichth.* p. 20; *Hollard, Ann. Sc. Nat.* i. 1854, p. 336.
—— arcuatus, *Bl. Schn.* p. 466.

D. 3 | 25. A. 22. L. lat. 48.

Tail with two series of recurved spines. About thirty-two scales in a transverse series, running from the origin of the dorsal fin to the vent. Some enlarged osseous scales behind the gill-opening. Dorsal and anal fins rather low, with rounded profiles; caudal fin slightly convex. Light brownish; a vertical black band from the eye to the pectoral fin; three narrow black lines between the eyes; the first dorsal fin, the base of the second, and the vent black; a broad black ring with bluish edges round the free portion of the tail; a curved bluish band, with dark central line and with the convexity directed forwards, at some distance in front of the black ring.

Mauritius.

a. Fine specimen.

23. Balistes undulatus.

Valent. figs. 78 & 343; *Renard,* i. tab. 43. f. 217, ii. tab. 2. f. 7, tab. 25. fig. 123; *Ruysch,* pl. 7. f. 4.
Balistes undulatus, *Mungo Park, Trans. Linn. Soc.* iii. p. 37; *Lacép.* iv. p. 682.
—— lineatus, *Bl. Schn.* p. 466, tab. 87; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 14; *Hollard, Ann. Sc. Nat.* i. 1854, p. 337.
—— aculeatus β. viridis, *Benn. Fish. Ceylon,* pl. 10.
—— capistratus, *Tiles. Mém. Ac. Sc. St. Pétersb.* vii. p. 301, pl. 9.
—— lamourouxii, *Quoy & Gaim. Voy. Uran. Zool.* p. 208, pl. 47. fig. 1.
—— sesquilineatus, *Benn. in Beechey, Voy,* p. 69, pl. 21. fig. 3.
—— porcatus, *Gronov. Syst.* ed. *Gray,* p. 32.
—— (Balistapus) lineatus, *Bleek. Ned. Tyds. Dierk.* iii. 1865, p. 24; *Atl. Ichth.* v. p. 118, pl. 229. fig. 2; *Kner, Novara, Fisch.* p. 400.

D. 3 | 27. A. 24. L. lat. 41.

Tail with six strong spines on each side, arranged in a double series. Twenty-four scales in a transverse series, running from the origin of the dorsal fin to the vent. Some small osseous plates behind the gill-opening. Dorsal and anal fins rather low, with rounded profile; caudal fin subtruncate. Blackish brown; head and body with numerous oblique and somewhat undulated yellowish or reddish stripes; two, broader than the others, proceed from the lips, and are confluent into one posteriorly. The first dorsal fin black, the other fins orange-coloured. The spines on each side of the tail in a black patch.

Indian and Pacific Oceans.

a. Adult: stuffed. Red Sea. From Dr. Rüppell's Collection.
b. Half-grown: skin. Zanzibar. From Lieut.-Col. Playfair's Collection.
c, *d–e*. Half-grown. Moluccas.
f. Adult: skin. Sumatra. From Mungo Park's Collection.—Type of the species.
g–h. Adult and half-grown. Amboyna. Purchased of Hr. Frank.
i. Several specimens. Ceram. Purchased of Mr. Stevens.
k–m. Adult and half-grown. Zebu (Philippines). Purchased of Mr. Jamrach.
n. Adult. China. Presented by Vice-Admiral Sir E. Belcher.
o. Adult: stuffed. Japan.
p–q. Adult: stuffed. Louisiade archipelago.
r. Adult: skin. From Gronow's Collection.
s–t. Adult. From the Haslar Collection.
u. Adult: skeleton. From the Haslar Collection.

The following species appears to belong to this division:—

24. Balistes oiré.

Bennett, *Whaling Voyage*, ii. p. 262.

"Head elongated. Three longitudinal rows of curved prickles on each side the tail; the two upper rows containing ten prickles, the lowest three; a black spot on the skin around the base of each spine. Back dusky, marked with longitudinal black lines; abdomen white. Light blue lines on the sides of the head, and encircling the mouth. Lips orange-colour; broad bands of the same hue extending from the mouth to the pectoral fins. Iris silvery; a yellow zone around the pupil. Fins white. A very distinct ventral fin is attached to the abdominal spine (balista) of this fish.

"Habitat. Coral reefs of Raiatea, Society Isles. Native name, Oiré."

2. *Teeth white, even, incisor-like*: Melanichthys.

25. Balistes buniva.

Willughby, tab. J. 24.
Capriscus, no. 3, *Klein*, *Pisc. Miss.* iii. p. 25.
Galafate, *Parra*, p. 18, lam. 11. fig. 1.

Balistes ringens, *Osbeck, Voy. Chin.* ii. p. 93 (not *Linn.*); *Bl.* taf. 152. fig. 2; *Bl. Schn.* p. 472: *Lacép.* i. p. 370, pl. 18. fig. 1; *Richards. Voy. Samar. Fish.* p. 21, pl. 6. figs. 1–4; *Hollard, Ann. Sc. Nat.* 1854, i. p. 317.
Baliste buniva, *Lacép.* v. p. 669, pl. 21. fig. 1.
Balistes piceus, *Poey, Proc. Ac. Nat. Sc. Philad.* 1863, p. 180, and *Repert. Fis.-nat. Cub.* ii. p. 435.
Melichthys ringens, *Bleek. Act. Soc. Sc. Indo-Neerl.* vi. *Sumatra*, viii. p. 69, and *Atl. Ichth.* v. p. 108, pl. 220. fig. 1.
Balistes niger, *Günth. in Fish. Zanz.* p. 135, pl. 19. fig. 1.

D. 3 | 31–33. A. 28–30. L. lat. 53.

Tail with about eight raised, spiny lines. A patch of enlarged osseous plates behind the gill-opening. Caudal lobes slightly produced in old examples. Entirely black; a white line along the base of the dorsal and anal fins; caudal fin with a black intramarginal line.

Tropical parts of the Atlantic; Indian and Pacific Oceans.

a–e. Adult and half-grown: skins and stuffed. Jamaica. Purchased of Mr. Parnell.
f. Half-grown. Jamaica. Purchased of Mr. Higgins.
g. Half-grown. St. Croix. Purchased of Mr. Stevens.
h. Large fine specimen. St. Helena. Presented by J. C. Melliss, Esq.
i. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
k. Adult. China Seas. Presented by Sir J. Richardson.
l. Half-grown: stuffed. Sandwich Islands. Purchased of Mr. Damon.
m–n. Adult: stuffed.

3. *Teeth brownish red; the lateral upper pair much projecting*: Erythrodon.

26. **Balistes erythrodon.**

Baliste noir, *Lacép.* i. pp. 378, 380, pl. 15. fig. 2.
Xenodon niger, *Rüpp. N. W. Fische*, p. 53, taf. 14. fig. 3; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 37 (not *Mungo Park*).
Erythrodon niger, *Rüpp. Verzeichn. Fisch. Senck. Mus.* p. 34; *Bleek. Atl. Ichth. Balist.* p. 106, pl. 5.
Balistes niger, *Hollard, Ann. Sc. Nat.* 1854, i. p. 315.

D. 3 | 35. A. 30. L. lat. 33.

Osseous plates behind the gill-opening. Dorsal and anal fins elevated in front; caudal lobes much produced. Indistinct raised lines along the series of scales on the tail. Entirely black; posterior margin of the caudal whitish.

Indian Ocean and archipelago.

a. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Adult: stuffed. Mauritius. From Dr. Janvier's Collection.
c. Adult. Ceram. Purchased of Mr. Stevens.

5. MONACANTHUS *.

Monacanthus *et* Alutarius, *Cuv. Règne An.*
Stephanolepis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1861, p. 78.
Monacanthus, Chætodermis, Paramonacanthus, Amanses (*Gray*), Pseudomonacanthus, Liomonacanthus, Oxymonacanthus, Brachaluteres, Acanthaluteres, Ceratacanthus, Paraluteres, Pseudaluteres, Aluteres, *Bleek. Ned. Tyds. Dierk.* iii. 1866, pp. 11–16.

Body compressed, covered with very small or minute rough scales; adult males of some of the species with a peculiar armature on the side of the tail, which, in females, is much less developed, or entirely absent. Upper jaw with a double series of incisor-like teeth, six in the outer, and four in the inner series; lower jaw with six similar teeth in a single series. The first dorsal fin reduced to a single strong spine, behind which generally another rudimentary spine. Ventral fins reduced to a simple osseous fixed or moveable small appendage, which is sometimes rudimentary or entirely absent. No barbel. Vertebræ $\frac{7}{11-14}$.

Tropical and subtropical seas.

---

* 1. Monacanthus pusillus, *Rüpp. Atl. Fisch.* p. 34.—Massowah.
2. Balistes freycineti, *Cuv. in Q. & G. Voy. Uran. Zool.* p. 213; Monacanthus freycineti, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 336, pl. 12. fig. 3.—Mauritius.
3. —— broccus, *Mitch. Trans. Lit. & Phil. Soc. New York*, i. p. 467; *Dekay, N. York Faun. Fish.* p. 335, pl. 56. fig. 183.—New York.
4. Aleuterius maculosus, *Richardson, Proc. Zool. Soc.* 1840, March 10th; *Trans. Zool. Soc.* iii. p. 170; *Voy. Ereb. & Terr. Fish.* p. 67, pl. 39. figs. 5–7; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 359.—Tasmania, New South Wales.
5. Monacanthus brevispinosus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 335.—Indian Ocean.—D. 36. A. 34. Dorsal and anal fins much elevated in front; profile of forehead rather convex.
6. —— freycineti, *Hollard, l. c.* p. 336, pl. 12. fig. 3, from New South Wales and Mauritius, is probably identical with one of our Australian species; however, the caudal spines (which stand in two series) are said to have the points directed backwards. The profile of the snout is convex according to the description, but concave in the figure.—D. 36. A. 35.
7. —— platifrons, *Hollard, l. c.* p. 341.—New South Wales.
8. —— serrasquamosus, *Hollard, l. c.* p. 345.—Bay of Islands.
9. —— tricuspis, *Hollard, l. c.* p. 351, pl. 13. fig. 3.—Indian Ocean.—D. 27. A. 27.
10. —— dumerilii, *Hollard, l. c.* p. 361.—Mauritius?—D. 34. A. 31. Taches lactées semées sur un fond obscur.
11. —— nitens, *Hollard, l. c.* p. 364, pl. 14. fig. 4.—Tongatabu.—D. 30. A. 24.
12. —— trachyderma, *Bleek. Act. Soc. Sc. Indo-Neerl.* viii. *Japan*, vi. p. 70.—Japan.—D. 26. A. 27.
13. Aluteres holbrookii, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 7.—North America.—D. 36. A. 39.
14. Balistes cuspicauda, *Mitch. Am. Month. Mag.* ii. p. 326; Aluteres cuspicauda, *Dekay, New York Faun. Fish.* p. 338, pl. 59. fig. 192; *Storer, Mem. Am. Ac.* viii. 1861, p. 427 (pl. 35. fig. 2).—New York.—D. 38. A. 42.
15. Monacanthus lineolatus, *Richards. Ichth. Chin.* p. 201.—China.—A. 34.

On the anatomy, see Hollard, Ann. Sc. Nat. 1853, xx. p. 71 *et seq.*, pl. 2.

The species can be arranged thus:—

I. *Anal fin with less than* 40 *rays* (24–36); *ventral spine present or absent*: Monacanthus, *m.*
  A. Dorsal spine without barbs.
    1. Ventral spine present, anchylosed to the pelvic bone (*Liomonacanthus*, *Amanses*, et *Oxymonacanthus*, Blkr.), p. 230.
    2. Ventral spine present, moveable (*Paramonacanthus*, sp., Blkr.), p. 233.
    3. Ventral spine none (*Paraluteres* et *Brachaluteres*, Blkr.), p. 234.
  B. Dorsal spine with only two series of barbs.
    1. The barbs point backwards and downwards.
      a. Ventral spine present, moveable; the cutaneous ventral expansion much developed, extending beyond the spine (*Monacanthus*, sp., Blkr.), p. 236.
      b. Ventral spine present, moveable; the cutaneous ventral expansion moderately developed, not extending beyond the spine (*Monacanthus*, sp., et *Paramonacanthus*, sp., Blkr.), p. 238.
      c. Ventral spine present, anchylosed to the pelvic bone, p. 243.
    2. The barbs are lateral, pointing outwards and downwards, p. 244.
  C. Dorsal spine with irregularly arranged barbs and filaments (*Chætodermis*, Blkr.), p. 245.
  D. Dorsal spine with four series of barbs.
    1. The front series are much closer together than the hinder series, and formed by small barbs (*Pseudomonacanthus*, sp., Blkr.), p. 246.
    2. The dorsal spine is four-edged, the edges being equidistant and armed with barbs (*Pseudomonacanthus*, sp., et *Acanthaluteres*, Blkr.), p. 249.
II. *Anal fin with* 40 (39) *or more rays. Ventral spine none*: Aluteres, *m.*
  A. Dorsal spine above the orbit.
    1. Dorsal spine with distinct barbs, p. 251.
    2. Dorsal spine feeble, rough, but without barbs (*Ceratacanthus* et *Aluteres*, Gill & Blkr.), p. 251.
  B. Dorsal spine in advance of the orbit (*Pseudaluteres*, Blkr.), p. 254.

I. *Anal fin with less than* 40 *rays* (24–36). *Ventral spine present or absent*: Monacanthus.

A. *Dorsal spine without barbs.*

1. *Ventral spine present, anchylosed to the pelvic bone.*

1. **Monacanthus pardalis.**

Synonymy of Indian specimens.

Grynzert, *Houtt.* i. p. 462, tab. 69. fig. 1.
? Balistes sandwichiensis, *Quoy & Gaim. Voy. Uran. Zool.* p. 214.
Monacanthus pardalis, *Rüpp. N. W. Fisch.* (1855) p. 57, taf. 15. fig. 3; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 328.

Monacanthus melanuropterus, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 781.
—— houttuyni, *Bleek. l. c.* v. p. 351.
—— aspersus, *Hollard, l. c.* p. 362.
Liomonacanthus pardalis, *Bleek. Ned. Tyds. Dierk.* iii. p. 27; *Atl. Ichth. Balist.* p. 136, tab. 230. fig. 2.
Monacanthus fronticinctus, *Günth. in Fish. Zanz.* p. 136, pl. 19. fig. 2 (typ. specimen, but not example no. 521).

Synonymy of Atlantic specimens.

Lija colorada, *Parra,* p. 49, lam. 23.
Monacanthus pullus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* 1842, v. p. 4, tab. 1.
—— ruppellii, *Casteln. Anim. Am. Sud, Poiss.* p. 97, pl. 47. fig. 2.
—— macrocerus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 327, pl. 12. fig. 1 (adult).
—— parraianus, *Poey, Proc. Ac. Nat. Sc. Philad.* 1863, p. 185.
—— irroratus, *Poey, Mem. Cub.* ii. p. 330.
—— punctatus, *Poey, Repert. Fis.-nat. Cub.* ii. p. 437.
—— stratus, *Poey, Mem. Cub.* ii. p. 329, and *l. c.* ii. p. 171.

D. 35–36. A. 30–31.

Scales minute, the skin having a velvety appearance. Large examples (12 inches long) with two pairs of strong recurved spines on each side of the tail. The hind margin of the orbit vertically above the axil of the pectoral fin. Body moderately elevated, its depth being one-half or rather more than one-half of the total length (without caudal). Snout moderately produced, with the upper profile slightly concave. Dorsal spine nearly straight, rather shorter than the head, without barbs, situated above the anterior part of the orbit. Caudal fin rounded, rather short. Ventral spine not moveable, attached to the abdomen by a simple membrane. Dorsal and anal fins rather low. The coloration varies. Generally a whitish spot behind the last dorsal ray.

Indian, Pacific, and Atlantic Oceans.

Var. α. Body with brown spots separated from one another by a network of whitish lines. Head with undulated bluish longitudinal stripes.

a, b. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
c. Half-grown: skin. Zanzibar. Presented by Lieut.-Col. Playfair.

Var. β. Uniform brown or brownish black.

d. Half-grown. Amboyna. Purchased of Hr. Frank.
e. Half-grown. Moluccas.
f–g. Adult (13 inches) and half-grown: skins. Aneiteum.
h. Adult (13 inches): skin. Jamaica. Purchased of Mr. Parnell.
i–l. Half-grown: skins. West Indies. Purchased of Mr. Scrivener.
m. Half-grown. West Indies. Purchased of Mr. Scrivener.
n. Young.

Var. γ. Brown, with indistinct darker spots.

o. Half-grown: skin. Zanzibar. From Lieut.-Col. Playfair's Collection.—Type of *M. fronticinctus.*

p. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.

q. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. melanuropterus.*

Var. δ. Several more or less distinct light longitudinal bands along the tail. Head with undulated bluish streaks. Body sometimes with scattered light round spots, each with a dark speck in the centre.

r–s. Half-grown. St. Croix. Purchased of Mr. Stevens.

t–v. Half-grown: skins. Jamaica. Purchased of Mr. Parnell.

w. Half-grown. Cuba. From the Collection of the Zoological Society.

x–y, z–α. Half-grown. Bahia. From Dr. Wucherer's Collection.

β–γ. Half-grown: stuffed. Bahia.

δ, ε–ζ. Half-grown. West Indies.

η–ι. Half-grown: stuffed. West Indies.

κ. Half-grown. From the Haslar Collection.

Var. ε. Young examples of uniform coloration, the sides and abdomen shining silvery.

λ. Young. St. Croix. Purchased of Mr. Stevens.

μ. Young. Cape of Good Hope.

ν–ξ. Young. China or Borneo? Presented by Vice-Admiral Sir E. Belcher.

ο, π, ρ, ς, τ. Several young examples.

2. **Monacanthus scopas.**

Guaperva hystrix, *Willughby*, tab. J. 21.
Balistes no. 5, *Artedi, Genera*, p. 54; *Synon.* p. 82.
Capriscus no. 5, *Klein, Pisc. Miss.* iii. p. 25.
Baliste hérissé, *Lacép.* i. p. 389, pl. 18. fig. 3.
Monacanthus scopas, *Cuv. Règne An.*
—— hystrix, *Burton, Proc. Zool. Soc.* 1834, p. 121.
—— (Amanses) hystrix, *Gray, Ind. Zool.*; *Burton, Proc. Zool. Soc.* ii. p. 121; *Bleek. Nat. Tyds. Ned. Ind.* v. p. 351.
Amanses scopas, *Bleek. Atl. Ichth. Balist.* p. 135, pl. 14. fig. 3; *Kner, Sitzgsber. Ak. Wiss. Wien*, 1866, liv. p. 390.

D. 27. A. 24.

Scales exceedingly small, rough; only those on the free portion of the tail of larger size. On each side of the tail, opposite to the dorsal and anal fins, a patch of spines; in the male they are very long, straight, and stiff, nearly as long as the dorsal spine, and directed backwards; there are about ten of these spines; in the female it is a patch of much shorter and thinner, more or less erect spines, like a brush. Body elevated, its depth being contained once and four-fifths in the total length (without caudal). Snout compressed, rather obtuse, with the upper profile scarcely concave. Dorsal spine strong, without spinelets, as long as the head, situated above the orbit. Caudal fin rounded, short. Ventral spine very short, not moveable. Dorsal and anal fins low. Uniform brown or black.

Indian Ocean and archipelago.

a–b. Adult (6 inches long) male and female. East-Indian archipelago. From Dr. Bleeker's Collection.
c. Adult. Celebes.

3. Monacanthus longirostris.

Valent. figs. 92 & 100; *Renard*, i. tab. 19. fig. 94, tab. 31. fig. 170, ii. tab. 36. fig. 165; *Ruysch*, tab. 4. fig. 23, tab. 12. fig. 18; *Seba*, iii. tab. 24. fig. 19, iii. tab. 34. fig. 2.
Balistes hispidus (part.), *L. Syst. Nat.* i. p. 405.
—— hispidus var. longirostris, *Bl. Schn.* p. 464.
Monacanthus longirostris, *Cuv. Règne An.*; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 331.
—— chrysospilus, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 126.
Oxymonacanthus longirostris, *Bleek. Atl. Ichth. Balist.* p. 137, pl. 10. fig. 1.

D. 32. A. 31.

Scales minute, rough, the spinules being a little longer on the side of the tail. Body oblong, its depth being one-third of the total length (without caudal). Snout much produced and pointed, the upper and lower profiles being nearly equally oblique. Dorsal spine rather strong, straight, rough, rather shorter than the snout, inserted above the middle of the eye. Caudal fin rounded, short. Ventral spine not moveable, attached to the abdomen by a simple membrane. Dorsal and anal fins low. Bluish or greenish, with more or less regular series of rounded reddish, dark-edged spots, which are larger than the spaces of the ground-colour between them. Sometimes a vertical black spot on the posterior half of the caudal fin; sometimes small, white, brown-edged ocelli above the ventral spine.

Indian Ocean and archipelago; Feejee Islands.

a, b. Three inches long. Amboyna.
c. Two inches long. Feejee Islands. From Dr. Bleeker's Collection.

2. *Ventral spine present, moveable.*

4. Monacanthus cryptodon.

Monacanthus cryptodon, *Bleek. Nat. Tyds. Ned. Ind.* viii. 1855, p. 431.
Paramonacanthus cryptodon, *Bleek. Atl. Ichth. Balist.* p. 131, pl. 225. fig. 1.

D. 26. A. 26.

Skin finely velvety. Body rather elevated, its depth being one-half of the total length (without caudal). Pectoral fin situated behind the vertical from the orbit. Snout not produced, with the upper profile straight. Dorsal spine of moderate strength, rough, but without barbs, three-fifths as long as the head, situated above the hinder part of the orbit. Caudal fin rounded; dorsal and anal fins low. Ventral spine tapering, moveable, without barbs, projecting beyond the abdominal flap. Brown, marbled with darker; a large black blotch below the anterior part of the dorsal fin; caudal fin with three dark cross bands.

Celebes; Amboyna.

a. Type of the species, 3½ inches long. Amboyna. From Dr. Bleeker's Collection.

5. Monacanthus curtorhynchus.

Monacanthus curtorhynchus, *Bleek. Nat. Tyds. Ned. Ind.* viii. 1855, p. 430.

Paramonacanthus curtorhynchus, *Bleek. Atl. Ichth. Balist.* p. 130, pl. 227. fig. 2.

D. 28. A. 27.

Skin finely velvety. Body oblong, its depth being two-fifths of the total length (without caudal). Pectoral fin situated behind the vertical from the orbit. Snout produced, with the upper profile convex. Dorsal spine rather feeble, rough, but without barbs, three-fifths as long as the head, situated above the hinder part of the orbit. Caudal fin rounded, sometimes the upper ray produced into a short filament; anterior part of the dorsal and anal fins elevated. Ventral spine tapering, moveable, without spinelets projecting beyond the abdominal flap. Brown, clouded and spotted with darker; caudal fin with two blackish cross bands.

Amboyna.

a. One of the typical specimens, 4 inches long. From Dr. Bleeker's Collection.

3. *Ventral spine none.*

6. Monacanthus prionurus.

Alutarius prionurus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 20, pl. 3. fig. 6; *Hollard, Ann. Sc. Nat.* 1854, ii. pl. 14. fig. 10; 1855, iv. p. 21.

Paraluteres prionurus, *Bleek. Atl. Ichth.* v. p. 138, pl. 227. fig. 1.

D. 25. A. 24.

Skin finely granulated; sides of the tail with fine bristles and two pairs of spines pointing forwards. Body moderately elevated, its depth being one-half of the total length (without caudal). Snout moderately produced, with the upper profile slightly concave. Dorsal spine of moderate strength, curved, shorter than the snout, without barbs, inserted behind the orbit. Gill-opening below the hind part of the orbit. Caudal fin rounded; dorsal and anal fins low. Ventral spine none. Three broad black bands across the back; head and anterior part of the trunk with black dots, confluent into undulated lines on the throat. (*Blkr.*)

East-Indian archipelago; New Guinea.

7. Monacanthus trossulus.

Aleuterius trossulus, *Richards. Voy. Ereb. & Terr. Fish.* p. 68, pl. 40. figs. 5 & 6; *Hollard, Ann. Sc. Nat.* 1855, iv. p. 6, pl. 1. fig. 1.

Brachaluteres trossulus, *Bleek. Ned. Tyds. Dierk.* iii. 1866, p. 13 (name only).

D. (25) 28. A. (23) 26.

Skin densely covered with slender, flexible, acute bristles, which are so delicate as to give a velvety feel to the finger. Body elevated; the height from the second dorsal fin (the commencement of which is the most elevated part of the dorsal profile) to the point of the pelvic bone is equal to the total length (without caudal). Snout obtuse, with the upper profile nearly straight. The dorsal spine stands over the middle of the orbit, and is roundish, much shorter than the head, and densely covered with minute grains, which lengthen into very fine acicular bristles. No ventral spine. Dorsal and anal fins low. Blackish green, with some minute darker specks and dots of a pale colour scattered over the body, and most crowded on the face and flanks. Along the pelvic bone and near the abdomen the dots run into streaks. (*Richards.*)

Western Australia.

The typical specimen ($2\frac{1}{4}$ inches long) does not appear to have been transferred to the British-Museum Collection, and is probably lost.

8. Monacanthus oculatus.

D. 24. A. 22.

Skin densely covered with minute bristles, producing a velvety appearance. Outline of the body subcircular, its depth being contained once and one-third in the total length (without caudal). No pelvic protuberance. Snout very obtuse, not projecting. The dorsal spine is rather stout but short, placed behind the eye, and about as long as the orbit; it has no barbs. Dorsal and anal fins of moderate depth. Olive-coloured (in spirits), with about nine rather irregular longitudinal rows of purplish ocelli edged with white, and about as large as the pupil of the eye.

South Australia.

a. One and a half inch long. Port Lincoln. From the collection of the Zoological Society.

Aleuterius (?) *baueri*, Richards. Voy. Ereb. & Terr. Fish. p. 68, is very closely allied to the above species, but, unfortunately, known from a drawing only. It is bright grass-green, with seven interrupted dark brown longitudinal stripes; nine short bars radiate from the orbit. The artist has represented a dentition similar to that of *Diodon*, but with notches on the edges of the jaws. Also the single teeth are not so well differentiated in *M. oculatus* as in other Monacanthes; but then it remains uncertain whether this is not due to the young age of the individual. I could distinguish four teeth clearly in the upper jaw, but two only in the lower.

B. *Dorsal spine with only two series of barbs.*

1. *The barbs point backwards and downwards.*

a. *Ventral spine present, moveable; the cutaneous ventral expansion much developed, extending beyond the spine.*

9. Monacanthus chinensis.

Valent. fig. 406.
Balistes chinensis, *Bl.* ii. p. 29, pl. 52. fig. 1; *Bl. Schn.* p. 468.
—— sinensis, *Gm. L.* i. p. 1470.
—— punctatus, *Marion de Procé, Bull. Philom.* 1822, p. 130.
Monacanthus chinensis, *Cuv. Règne An.*; *Bleek. Ned. Tyds. Dierk.* iii. p. 26, or *Atl. Ichth.* v. p. 125, pl. 222. f. 2.
—— geographicus, *Cuv. Règne An.*; *Cant. Mal. Fish.* p. 348; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 17.
? Monacanthus tomentosus, *Cant. Mal. Fish.* p. 347.
Monacanthus cantoris, *Bleek. l. c.*, or *Nat. Tyds. Ned. Ind.* iii. p. 80.
Balistes granulosus, *Gronov. Syst.* ed. *Gray*, p. 34.

D. 28. A. 28–29. Vert. 7/11.

Scales exceedingly small, rough, each with a median crest which sometimes terminates in a spine. On each side of the tail six spines directed forwards, and disposed in two rows; they are scarcely visible in young examples and females. Body elevated, its depth being contained once and a half or once and three-fourths in the total length (without caudal); the upper profile rises from the dorsal spine to the origin of the soft dorsal, which is the highest point on the back. Snout pointed, with the upper profile concave. Dorsal spine strong, shorter than the head, armed behind with a double series of strong recurved spines, inserted above the posterior half of the eye. Caudal fin rounded, rather shorter than the head; old males with the upper caudal ray slightly produced. Ventral spine moveable, tapering, without spinelets, attached to the cutaneous ventral expansion, which is much developed, extending beyond the spine. Dorsal and anal fins moderately elevated, the sixth or seventh rays being the longest, about half as long as the head. Brownish, irregularly marbled with blackish, and the whole body or part of it with numerous small brown spots. Vertical fins crossed by series of small black dots or lines.

China; East-Indian archipelago.

a, *b–c*. Adult (9 inches long) and half-grown. North China. Purchased of Mr. Jamrach.
d. Adult: skin. China. Presented by J. R. Reeves, Esq.
e, *f*. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
?*g*. Half-grown: skin. Pinang. From Dr. Cantor's Collection.—Type of *M. tomentosus*, Cant.
h–i. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.
k. Half-grown. Pinang. From Dr. Cantor's Collection.
l, *m–o*. Adult and half-grown. Singapore.
p. Adult. From the Collection of the Zoological Society.

q. Adult: skin. From Gronow's Collection.
r, *s–t*. Adult: skins.
u. Adult: skeleton. Shanghai. Purchased of Mr. Jamrach.

10. Monacanthus megalurus.

? Monacanthus bifilamentosus, *Less. Voy. Coq. Poiss.* p. 109, pl. 8.
Monacanthus megalourus, *Richards. Ic. Pisc.* p. 5 pl. 1. f. 3.
—— chinensis, *Richards. Voy. Ereb. & Terr. Fish.* p. 64, pl. 40. figs. 3 & 4; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 346.

Closely allied to *M. chinensis*, but with larger scales, more slender dorsal spine, &c.

D. 32. A. 31.

Scales as in *M. chinensis*, but larger; there are about twenty in a transverse series running from the end of the dorsal fin to that of the anal. A double series of caudal spines as in *M. chinensis*. Body elevated, its depth being contained once and three-fourths in the total length (without caudal); the upper profile rises from the dorsal spine to the origin of the soft dorsal, which is the highest point on the back. Snout pointed, with the upper profile concave. Dorsal spine rather slender, shorter than the head, armed behind with a double series of strong recurved spines, inserted above the posterior half of the eye. Caudal fin rounded, as long as the head; old males with the upper caudal ray produced. Ventral spine moveable, tapering, without spinelets, attached to the cutaneous ventral expansion, which is much developed, far extending beyond the spine. Dorsal and anal fins moderately elevated, the longest rays being more than half as long as the head. Brownish, marbled with darker; anal fin with a network of blackish meshes; caudal with one or two bluish intramarginal transverse lines, and sometimes with blackish dots.

Australian seas.

a–b. Adult: skins (10 inches long). Australia.
c. Adult: skin. Port Jackson. Purchased of Mr. Gould.
d–e. Half-grown: skins. Freycinet's Harbour. Voyage of the 'Herald.'
f. Adult. Presented by the Royal College of Surgeons.

11. Monacanthus occidentalis.

? Pira-aca, *Marcgr.* p. 154; *Willughby*, tab. J. 4. fig. 1.
Monacanthus tomentosus, *Müll. & Trosch. in Schomburgk, Barbadoes*, p. 676; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 348, pl. 13. fig. 5.
? Monacanthus piraaca, *Kner, Novara, Fisch.* p. 396.

D. 33. A. 31.

Scales exceedingly small, without median crest, the skin having a velvety appearance; they are much larger and imbricate on the abdominal flap, which is much developed, extending far beyond the point of the ventral spine. On each side of the tail one or two pairs of small spines in adult examples. Body elevated, its depth being about two-thirds of the total length (without caudal). The profile between the dorsal fins is concave, the commencement of the soft dorsal being the highest point. Snout pointed, with the upper profile concave. Dorsal spine strong, not much shorter than the head, armed behind with a double series of barbs, inserted above the posterior part of the eye. Gill-opening and pectoral fin below the orbit. Caudal fin rounded, dorsal and anal low. Ventral spine moveable, tapering, rough, very small, brownish, marbled with darker.

West Indies; Central-American coasts.

a. Three inches long. Puerto Cabello. Purchased of Hr. Brandt.
b. Skin, 2½ inches long. Purchased of Mr. Yarrell.

b. *Ventral spine present, moveable; the cutaneous ventral expansion moderately developed, not extending beyond the spine.*

12. Monacanthus tomentosus.

Balistes, sp., *Gronov. Mus. Ichth.* i. p. 53. no. 114, or *Zoophyl.* no. 191, tab. 6. fig. 5; *Seba*, iii. tab. 24. fig. 18.
Balistes tomentosus, *L. Syst. Nat.* i. p. 405; *Gronov. Syst.* ed. *Gray*, p. 34.
Baliste velu, *Lacép.* i. pp. 333, 359.
Monacanthus tomentosus, *Cuv. Règne An.*; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 19, and *Atl. Ichth.* v. p. 127, pl. 220. fig. 1, pl. 229. fig. 1.
—— hajam, *Bleek. l. c.* 1°, p. 18, tab. 1. fig. 1, and *l. c.* 2°, p. 126, pl. 230. figs. 1 & 3.
—— trichurus, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 125.
—— helleri, *Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1867, lv. p. 712, taf. 3. fig. 3.

D. 27–29. A. 25–27.

Scales exceedingly small, each with four or five spines on the margin; on each side of the tail an oblong patch of short setiform spines, well developed in adult males, but very small or entirely absent in females and young. Body sometimes with scattered short filaments. Body elevated, its depth being one-half or two-thirds of the total length (without caudal). Snout pointed, with the upper profile concave. Dorsal spine very strong, about as long as the head, armed behind with a double series of strong recurved spines, situated above the eye, nearer to its posterior than to its anterior margin. Caudal fin rounded. Ventral spine moveable, armed with curved spinelets on the side, separated from the ventral rays. Dorsal and anal fins low. Brown, marbled with blackish; an indistinct whitish longitudinal band on the side of the trunk, behind the gill-opening. Caudal with two blackish cross bands.

East-Indian archipelago; China; Australia.

a. Adult (5 inches long). East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *M. hajam*.
b. Adult. East-Indian archipelago. From Dr. Bleeker's Collection, as *M. tomentosus*.
c. Adult. East-Indian archipelago. From Dr. Bleeker's Collection. —Type of *M. trichurus*.

d–g. Half-grown. Singapore.
h. Adult female. Amboyna. Purchased of Hr. Frank.
i. Adult. Ceram. Purchased of Hr. Frank.
k. Several young specimens. Australia. Purchased of Mr. Dalton.

13. Monacanthus sulcatus.

Monacanthus sulcatus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 363, pl. 14. fig. 3 (not good).
—— isogramma, *Bleck. Nat. Tyds. Ned. Ind.* xiii. 1857, p. 367; *Atl. Ichth. Balist.* p. 128, pl. 222. fig. 1.

D. 29–32. A. 31–33.

Scales minute, spiny, each with a keel, *the keels confluent, forming parallel longitudinal raised lines.* Body rather elevated, its depth being a little more than one-half of the total length (without caudal). The dorsal profile between the dorsal fins somewhat oblique, the commencement of the second dorsal fin being the highest point. Snout slightly pointed, with the upper profile nearly straight. Dorsal spine of moderate strength, tapering, shorter than the head, armed with two series of barbs behind, situated above the posterior part of the orbit. Caudal fin rounded, sometimes with the upper ray produced into a short filament. Dorsal and anal fins of moderate height. Ventral spine moveable, tapering, rough, free from and extending beyond the ventral flap. Brown, irregularly marbled with darker; sometimes a rounded blackish blotch below the anterior third of the dorsal.

East-Indian archipelago; Chinese and Australian seas.

a. Three and a half inches long. Java. From Dr. Bleeker's Collection.—Type of *M. isogramma*.
b, c, d. Three and a half inches long. China.
e, f. Three and a half inches long. North China. Purchased of Mr. Jamrach.
g–h. Three and a half inches long. Australia. Collected by Mr. McGillivray.
i–m. Three and a half inches long. From the Haslar Collection.

14. Monacanthus setifer.

Monacanthus setifer, *Bennett, Proc. Comm. Zool. Soc.* 1830, p. 112; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 342, pl. 12. fig. 4.
—— cirrifer, *Schleg. Faun. Japon. Poiss.* p. 290, pl. 130. fig. 1; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 31.
—— varius, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* 1842, v. p. 6, tab. 2.
—— broccus, *Storer, Proc. Bost. Soc. Nat. Hist.* 1842, p. 84 (not *Mitch.*).
—— filamentosus, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 95, pl. 17. fig. 1.
—— gallinula, *Valenc. l. c.*
—— signifer, *Storer, Mem. Am. Ac.* ii. 1846, p. 497, and viii. p. 426 (pl. 35. fig. 1).
—— auriga, *Lowe, Proc. Zool. Soc.* 1850, p. 253.

Monacanthus setifer, *Dekay, New York Faun. Fish.* p. 337, pl. 59. fig. 194.
—— massachusettensis, *Storer, Fish. Mass.* p. 174, and *Mem. Am. Ac.* viii. p. 425 (pl. 34. fig. 4); *Dekay, l. c.* p. 336, pl. 57. fig. 187.
—— komuki, *Bleek. l. c.* pl. 3. fig. 3, and *Verh. Ak. Wet.* i. *Japan*, p. 13, c. fig.
—— auratus, *Castelnau, Poiss. d'Afr. Austr.* p. 77.
? Monacanthus oppositus, *Poey, Mem. Cub.* ii. p. 331.

D. 28–34. A. 29–33.

Scales minute, but distinct, not very rough, the skin having a velvety appearance; sometimes with minute cirrhi. In old examples the sides of the tail are covered with short, delicate bristles. Dorsal spine above or immediately behind the hind margin of the orbit, granular in front, and armed with a double series of barbs behind. Body elevated, its depth being one-half or more than one-half of the total length (without caudal). The origin of the dorsal fin is the highest point in the dorsal profile. Snout moderately produced, with the upper profile straight. Caudal fin rounded. Ventral spine moveable, small, attached to the abdominal membrane. Dorsal and anal fins of moderate height; the second dorsal ray is in some adult specimens produced into a very long filament. Brown, with obscure blackish spots or streaks.

Var. α. Dorsal spine rather feeble, one-half or two-fifths of the length of the head. Japan and China; (East Africa.)

a–d. Adult (10 inches long): stuffed. Japan. Purchased of Hr. Frank.
e–g. Adult and young. North China. Purchased of Mr. Jamrach.
h. Young. China. Presented by Vice-Admiral Sir E. Belcher.
i. Adult: skin. Zanzibar. From Lieut.-Col. Playfair's Collection (521).
k–l. Half-grown and young. From Mr. Stokes's Collection.

Var. β. Dorsal spine strong, more than one-half of the length of the head. Tropical and subtropical parts of the Atlantic; East Africa.

m. Adult. Madeira. From the Haslar Collection.
n. Adult (10 inches long). Lanzarote. Presented by the Rev. R. T. Lowe.
o. Adult. Cape Verde Islands. Presented by the Rev. R. T. Lowe.
p. Several half-grown specimens: skins. Jamaica. Purchased of Mr. Parnell.
q. Half-grown. Cuba. From the Collection of the Zoological Society.
r. Young. Trinidad. Presented by J. B. Richardson, Esq.
s. Young. West Indies. From M. Sallé's Collection.
t, u–v. Adult and half-grown. Port Natal. From Mr. Ayres's Collection.
w. Half-grown.

15. Monacanthus nematophorus.

? Monacanthus villosus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 333, pl. 12. fig. 2.

D. 25. A. 25.

Skin velvety, with scattered long, fringed filaments. Dorsal spine above the hind margin of the orbit, strong, rather shorter than the head, armed with a double series of barbs behind. The dorsal profile between the fins is nearly horizontal. The depth of the body is not quite one-half of the total length (without caudal). Snout moderately produced, with the upper profile scarcely concave. Caudal rounded. Ventral spine moveable, spiny, free from the abdominal flap. Dorsal and anal fins rather low. Uniform brownish.

? China or Borneo.

a. One and three-fourths inch long. Presented by Vice-Admiral Sir E. Belcher.

16. Monacanthus oblongus.

Monacanthus oblongus, *Schleg. Faun. Japon. Poiss.* p. 291, pl. 130. fig. 2; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 34, tab. 3. fig. 1.
—— broekii, *Bleek. l. c.* p. 35, fig. 2.
—— frenatus, *Peters, Monatsber. Ak. Wiss. Berlin*, 1855, p. 464.
—— bertolonii, *Bianconi, Mem. Acad. Sc. Inst. Bonon.* vi. 1855, p. 148, tab. 3. fig. 2.

D. 25–28. A. 25–29.

Skin finely velvety. Body sometimes oblong, sometimes more elevated, its depth being contained twice or twice and a half in the total length (without caudal). Pectoral situated behind the vertical from the orbit. Snout more or less produced, with the upper profile nearly straight. Dorsal spine sometimes rather feeble, sometimes rather stronger, from two-fifths to three-fourths of the length of the head, armed with two series of small barbs behind, situated above or behind the posterior margin of the orbit. Caudal fin rounded, sometimes with the upper or the middle rays slightly produced; *dorsal and anal fins conspicuously elevated in front* (one example has the anterior dorsal rays produced into filaments). Ventral spine small, pointed, moveable, without or with very small spinelets. Uniform brownish, or irregularly marbled with darker; or body with numerous brown dots, confluent into irregular lines on the side of the head. Dorsal and anal fins generally with a narrow black edge.

Japan; Zanzibar.

a. Six and a half inches long: stuffed.
b. Three and a half inches long: skin in spirits. Purchased of Hr. Frank.—One of the types.
c. Four inches long. From Dr. Bleeker's Collection.—This example has been received as typical of *M. nemurus*, but cannot belong to that species if correctly described and figured. This speci-

men has the dorsal and anal fins as much elevated as specimen *b*.

d, e, f. Several examples, 3–4 inches long. Zanzibar. Presented by Messrs. Playfair and Kirk.

This species is subject to numerous variations of form and colour, independent of locality or age. Examples of 3–4 inches in length appear to be adult.

17. Monacanthus chœrocephalus.

Monacanthus choirocephalus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 19, pl. 2. fig. 4.

Paramonacanthus choirocephalus, *Bleek. Atl. Ichth. Balist.* p. 131, pl. 227. fig. 3.

D. 28. A. 30.

Skin finely velvety. Body rather elevated, its depth being more than one-half of the total length (without caudal). Pectoral situated immediately behind the vertical from the orbit. Snout of moderate length, with the upper profile nearly straight. Dorsal spine rather strong, not much shorter than the head, armed with two rows of barbs behind, situated above the hinder half of the orbit. Caudal fin rounded, dorsal and anal fins low. Ventral spine small, moveable, with spinelets. Brownish, with a round blackish spot in the middle of the side. Caudal with two cross bands.

East-Indian archipelago.

a. Type of the species, $3\frac{1}{2}$ inches long. From Dr. Bleeker's Collection.

Monacanthus nemurus, Bleek. Verh. Bat. Gen. xxiv. Balist. p. 20, pl. 2. fig. 3, or *Paramonacanthus nemurus*, Bleek. Atl. Ichth. Bal. p. 132, pl. 225. fig. 2, from Java and Singapore, is closely allied to *M. choirocephalus*, but has the body somewhat less elevated, and the upper profile of the snout a little convex (the upper caudal ray is produced into a short filament).

18. Monacanthus melanocephalus.

Balistes monoceros, *Lacép.* i. pl. 17. fig. 3, c. descript. part.

Monacanthus melanocephalus, *Bleck. Nat. Tyds. Ned. Ind.* v. p. 95; *Atl. Ichth.* v. p. 127, pl. 223. fig. 1.

—— janthinosoma, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 503.

? Monacanthus aspricaudus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 330.

D. 31–32. A. 26–28.

Body covered with small but very distinct scales; each scale spiny, the spinelets being larger and hooked towards the root of the caudal. Body rather oblong, its depth being about one-half of the total length (without caudal). Pectoral fin situated behind the vertical from the orbit. Snout of moderate length, rather pointed, with the upper profile concave. Dorsal spine situated above the middle of the orbit, strong and long, nearly as long as the head, armed on each side with a series of barbs, rough in front. Caudal rounded; dorsal and anal fins rather low. Ventral spine prominently moveable, with spinelets. Brown, with a black spot on the gill-opening. Some undulated black intramarginal lines on the caudal fin. Dorsal and anal fins dotted with blackish.

East-Indian archipelago.

a. Three and a half inches long. From Dr. Bleeker's Collection, as typical of *M. melanocephalus*.

b. Three and a half inches long. From Dr. Bleeker's Collection, as typical of *M. janthinosoma*.

19. **Monacanthus spilosoma.**

Bennett, Beechey's Voy. Fish. p. 70, pl. 22. fig. 1.

D. 37. A. 33.

Scales very small; surface rough, the edge of each scale being raised and provided with a few spines. Body oblong, its depth being contained twice and two-thirds in the total length (without caudal). Snout pointed, with the upper profile slightly concave. Dorsal spine strong, straight, nearly as long as the head, armed with a double series of barbs behind, situated above the posterior part of the orbit. Caudal rounded; dorsal and anal fins of moderate height, with the outer margin nearly straight. Ventral spine well developed, moveable, provided with barbs, free, the abdominal flap being but little developed. Gill-opening below the posterior part of the orbit. Light brownish (in a dried state), with numerous rounded brown spots of the size of the pupil of the eye, arranged in irregular longitudinal series. Side of the head with four or five black lines running in an oblique direction from the upper profile of the snout towards the branchial and subbranchial region. Caudal fin with brown dots and with a black margin, which, again, has a whitish edge. Dorsal and anal fins lineolated with blackish.

Sandwich Islands.

a. Skin, 4 inches long. Purchased of Mr. Damon.

c. *Ventral spine present, anchylosed to the pelvic bone.*

20. **Monacanthus granulosus.**

?? Balistes papillosus, *L. Syst. Nat.* p. 405; *Bl. Schn.* p. 475.

Balistes granulata, *White, Journ. N. S. Wales*, p. 295, pl. (p. 254) fig. 2.

Monacanthus granulatus, ***Richards. Voy. Ereb. & Terr. Fish.*** p. 63, pl. 40. figs. 1 & 2 (not good).

D. 30. A. 28–29. Vert. 7/11.

Body covered with papillæ, each with a round expansion at the top, like a mushroom; in dried examples they shrink, assuming the appearance of a short spine. Body rather oblong, its depth being nearly one-half of the total length (without caudal). Snout moderately produced, with the upper profile slightly concave. Dorsal spine strong, barbed behind, but not in front, rather shorter than the head, situated above the posterior half of the orbit. Caudal rounded, of moderate length; dorsal and anal fins low. Ventral spine very short, not moveable. Brownish, with some indistinct darker blotches.

New South Wales.

a–c. Adult (9 inches) and half-grown. Sydney. From Mr. Krefft's Collection.

d. Young. Australia. Presented by the Earl of Derby.

e–h. Half-grown: skins. Australia.

i. Adult: skeleton. Sydney. Presented by G. Krefft, Esq.

21. Monacanthus rudis.

Monacanthus rudis, *Richards. Trans. Zool. Soc.* iii. p. 166, and *Voy. Ereb. & Terr. Fish.* p. 65, pl. 40. figs. 7 & 8; ? *Hollard, Ann. Sc. Nat.* 1854, ii. p. 339.

D. 34–35. A. 34.

Body covered with minute, rough, but distinct scales. Body oblong, its depth being two-fifths of the total length (without caudal). Pectoral fin situated behind the vertical from the orbit. Snout long, with the upper profile convex. Dorsal spine inserted above the posterior half of the orbit, of moderate strength, two-thirds as long as the head, armed with a double series of small barbs behind, rough in front. Caudal fin rounded, dorsal and anal fins low. Ventral spine very small, fixed. Brown, uniform or with four indistinct, broad whitish longitudinal bands. Caudal fin with a broad blackish margin.

Tasmania.

a. Nine inches long: stuffed. Port Arthur.—Type of the species.

b. Eight inches long: stuffed. Tasmania.

2. *The barbs are lateral, pointed outwards and downwards.*

22. Monacanthus ayraudi.

Balistes ayraudi, *Quoy & Gaim. Voy. Uran. Zool.* p. 216, pl. 47. fig. 2.

Aluteres velutinus, *Jenyns, Voy. Beagle, Fish.* p. 157.

Monacanthus vittatus, (*Solander*) *Richards. Voy. Ereb. & Terr. Ichth.* p. 66; *Steindachner, Sitzgsber. Ak. Wiss. Wien,* 1866, liii. p. 476, and 1867, lvi. p. 335.

—— frauenfeldii, *Kner, Novara, Fisch.* p. 397.

D. 32. A. 31.

Skin rough, velvety. Body elongate, its depth being one-third or rather less than one-third of the total length (without caudal). Pectoral fin situated below the hinder half of the orbit, immediately in front of the vertical from the dorsal spine. Snout very long, rather obtuse, with the upper profile a little convex. Dorsal spine rather feeble, compressed in the direction of the longitudinal axis of the body, armed with a single lateral series of barbs. Caudal fin subtruncate, the upper lobe slightly produced in old examples; dorsal and anal fins elevated in front. Ventral spine very small, fixed. Brownish, with two or four whitish longitudinal bands, the middle of which are broad and more distinct than the outer; sometimes uniform brownish.

Australia.

a. Adult (18 inches long). Sydney. From Mr. Krefft's Collection.
b. Young. Port Jackson. From Mr. McGillivray's Collection.
c. Adult and young: stuffed. Australia. Purchased of Mr. Cuming.

C. *Dorsal spine with irregularly arranged barbs and filaments.*

23. Monacanthus penicilligerus.

Monacanthus penicilligerus, *Cuv. Règne An.*; *Cant. Mal. Fish.* p. 351; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 350, pl. 13. fig. 2; *Bleek. Nat. Tyds. Ned. Ind.* xvii. p. 173.

—— spinosissimus, *Quoy & Gaim. Voy. Uran. Zool.* p. 211, pl. 45. figs. 3–8.

Chætodermis penicilligerus, *Bleek. Atl. Ichth. Balist.* p. 129, pl. 221. fig. 3.

D. 26. A. 24.

Body covered with compressed, three-rooted spines, forming irregular longitudinal series. Fringed fleshy filaments on the dorsal and ventral spines, head, and body. Body elevated, its greatest depth being contained from once and one-sixth to once and one-half in the total length (without caudal). The origin of the soft dorsal fin is level with, or but little raised above, the base of the dorsal spine. Snout with the upper profile straight or but little concave. Dorsal spine of moderate strength and length, with spinelets irregularly arranged; it is inserted immediately behind the orbit. Caudal fin more or less elongate, especially in old examples. Ventral spine fixed, spiny, projecting beyond the abdominal membrane. Dorsal and anal fins of moderate height. Brownish, irregularly marked with darker; a round black spot in the middle of the side; some straight black lines along the body and tail. Vertical fins with numerous black dots.

East-Indian archipelago. Australia.

a. Adult (10 inches long). Australia. From Mr. Krefft's Collection.
b. Adult: stuffed. Australia. From Mr. McGillivray's Collection.
c. Adult: skin. Freycinet's Harbour. Voyage of the 'Herald.'
d. Young. Cape York. From Hr. Dämel's Collection.
e. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
f. Adult: skin. Pinang. From Dr. Cantor's Collection.
g–h. Adult and young.

D. *Dorsal spine with four series of barbs.*

1. *The front series are much closer together than the hinder series, and formed by small barbs.*

24. Monacanthus hippocrepis.

Balistes hippocrepis, *Quoy & Gaim. Voy. Uran. Zool.* p. 212.
Aleuterius variabilis, *Richards. Voy. Ereb. & Terr. Fish.* p. 67, pl. 53. figs. 1–7.
Monacanthus hippocrepis, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 338; *Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1868, lvii. p. 1002.

D. 35–37. A. 33–36.

Skin rough, velvet-like. Old examples (16–17 inches long) with four or six strong spines on each side of the tail, disposed in a double series, their points being directed forwards. In younger examples (females?) these spines are comparatively smaller, with the points directed backwards. Body elongate, its depth being two-fifths of the total length (without caudal). Pectoral fin situated behind the vertical from the orbit. Snout long, obtuse, with the upper profile rather convex. Dorsal spine rather strong, two-thirds of the length of the head, situated above the posterior half of the orbit; it is armed behind with a double series of small barbs, and in front with a double series of small tubercles. Caudal fin subtruncate, with the corners rounded; dorsal and anal fins low. Ventral spine very small, fixed. Brown, with undulated bluish bands on the snout and along the lowerside. Two or three blue bands or series of spots along the back, one along the base of the anal. Side of the trunk with a horseshoe-like black marking enclosing a yellow spot; or with a yellow blotch spotted with brown. Caudal fin with a black crescent-shaped cross band.

New South Wales.

a. Fine specimen, 17 inches long. Sydney. From Mr. Krefft's Collection.
b. Half-grown: stuffed. South Australia.
c, *d*. Adult: stuffed. Australia.
e. Half-grown: stuffed. Australia. From Mr. Gould's Collection. —Type of *A. variabilis*.
f. Half-grown. From the Haslar Collection.

25. Monacanthus knerii.

Monacanthus (Paramonacanthus) knerii, *Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1867, lv. p. 591.

D. 35. A. 34.

Skin velvety. Two rows of thin hook-like spines pointing backwards on each side of the tail. The height of the body is one-half of the total length (without caudal). Snout with the upper profile rather concave. Dorsal spine armed behind with a series of five large barbs on each edge, and with a double series of more numerous and smaller barbs in front. Ventral spine small, moveable, armed with spikes. Caudal fin rounded. Brownish grey; bluish-green curved lines on the sides of the snout; other stripes below them, of a brown colour, and running towards the pectoral and the abdomen. Brown horizontal lines on the upper anterior part of the trunk. Upper half of the body with three broad, black longitudinal bands. Caudal fins with two blackish cross bands and white margin. (*Steind.*)

China.

26. Monacanthus gunnii.

D. 34. A. 33.

Skin velvety, without distinct scales. Body somewhat elevated, its depth being a little more than one-half of the total length (without caudal). Snout rather produced, with the upper profile very slightly concave. Gill-opening much advanced, its greater portion being in front of the eye; pectoral fin below the middle of the orbit. Dorsal spine strong, above the middle of the orbit, with a double row of barbs in front and behind, the anterior rows being much closer together than the posterior. Caudal rounded; dorsal and anal fins low. Ventral spine small, fixed, with spikes pointing forwards and backwards. Dark brown, mottled with black.

Van Diemen's Land.

a. Eleven inches long. Van Diemen's Land. Presented by R. Gunn, Esq.

27. Monacanthus macrurus.

Monacanthus macrurus, *Bleek. Nat. Tyds. Ned. Ind.* xii. 1857, p. 226.

Pseudomonacanthus macrurus, *Bleek. Atl. Ichth. Balist.* p. 134, pl. 228. fig. 1.

D. 31. A. 29.

Body covered with small spiny but very distinct scales, and with scattered cutaneous filaments. Adult examples with a series of large, simple, or hooked spines on each side of the lower part of the tail. Body rather oblong, its depth being a little less than one-half of the total length (without caudal). Snout of moderate length, *with the upper profile concave.* Gill-opening advanced, partly in front of the vertical from the anterior margin of the eye; pectoral fin below the middle of the orbit. Dorsal spine situated above the middle of the eye, rather strong, but much shorter than the head, armed in front with a double series of barbs which are closely set and smaller than those behind. Caudal fin rounded, as long as the head; dorsal and anal fins low. Ventral spine very small, fixed, not prominent. Olive-coloured, clouded with brownish; head, body, and caudal fin with numerous brown dots.

East-Indian archipelago.

a. One of the typical specimens, 7 inches long. From Dr. Bleeker's Collection.

28. Monacanthus convexirostris.

D. 34–37. A. 32–35.

Body covered with small spiny but very distinct scales, without cutaneous filaments. Body rather oblong, its depth being about two-fifths of the total length (without caudal). Snout rather produced, *with the upper profile convex*. Gill-opening much advanced, partly in front of the vertical from the anterior margin of the eye; pectoral fin below the middle of the orbit. Dorsal spine situated above the hinder half of the eye, rather strong, but much shorter than the head, armed in front with a double series of barbs, which are closely set and smaller than those behind. Caudal fin rounded, shorter than the head; dorsal and anal fins low. Ventral spine small, fixed, prominent, with barbs. Coloration uniform greyish, or clouded with darker.

Tasmania and New Zealand.

a–b. Nine inches long, in bad state. George Town. Presented by R. Gunn, Esq.

c. Skin, 8½ inches long. New Zealand. Presented by Dr. Sinclair.

d–e. Stuffed, 9½ inches long.

29. Monacanthus multiradiatus.

D. 38. A. 36.

Body covered with minute, rough scales, with short bristles on the side of the tail, which, in adult examples, is armed with three pairs of strong spines pointing forwards. Body oblong, its depth being contained twice and three-fourths in the total length (without caudal). Snout produced, with the upper profile convex. Gill-opening situated below the hind margin of the orbit, the pectoral fin being entirely behind the vertical from the eye. Dorsal spine compressed in the direction of the longitudinal axis of the body, armed laterally with a row of barbs, and in front with a double series of small, very closely set barbs; it is smooth behind, rather feeble, and situated above the hinder part of the orbit. Caudal fin truncate; dorsal and anal fins low. Ventral spine very small, rough, free from the abdominal flap. Coloration uniform brownish grey; the base of the caudal spines and the hind margin of the caudal fin light-coloured.

South Australia.

a. Stuffed, 18 inches long.

30. Monacanthus trachylepis.

D. 39. A. 35.

Scales not distinct, replaced by short vertical prominences, each of which bears from three to five spinelets. Tail with two pairs of strong, compressed spines bent forwards. Body oblong, its depth being contained twice and two-thirds in the total length (without caudal). Snout produced, with the upper profile straight. Gill-opening below the hinder half of the orbit; pectoral fin behind the vertical from the hind margin of the orbit. Dorsal spine strong, very long, nearly as long as the head, situated above the posterior half of the orbit; it is armed behind with a double series of very small barbs, and there is also a double series of minute barbs in the median line of the anterior surface of the spine. Caudal fin rounded, short; dorsal and anal fins low. Ventral spine very small, fixed, with very short spikes radiating from its centre. Uniform blackish brown, dorsal and anal fins yellowish.

Australia.

a. Stuffed, 14 inches long. Purchased of Mr. Cuming.

2. *The dorsal spine is four-edged, the edges being equidistant and armed with barbs.*

31. Monacanthus peronii.

Monacanthus peronii, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 356, pl. 13. fig. 4.

D. 33–35. A. 33.

Body covered with papillæ, each with a round expansion at the top, like a mushroom; in examples exposed to the air for some time they shrink, assuming the appearance of a spine. Adult males with a band of long stiff slender spines on each side of the tail between the dorsal and anal fins, like a tooth-brush. Body oblong, its depth being contained twice and one-third in the total length (without caudal). Snout produced, with the upper profile very slightly concave; base of the pectoral fin below the hinder part of the eye. Dorsal spine straight, four-edged, each edge with a series of barbs, the anterior barbs being stronger than the posterior; the spine is inserted above the middle of the orbit, and not more than one-half of the length of the head. Caudal fin rounded; dorsal and anal fins low. Ventral spine very short, fixed. Uniform brownish, or with small brown spots.

Southern Australia.

a–b. Adult male and female (10 inches long). George Town. Presented by R. Gunn, Esq.
c. Half-grown. Melbourne. From Mr. Krefft's Collection.
d. Adult male: skin. Australia. Purchased of Mr. Cuming.

Balistes scaber (Forst.), Bl. Schn. p. 477, from Queen Charlotte's Sound, New Zealand, appears to be allied to this species; but the manuscript drawing made by Forster represents the dorsal spine as much more slender, without strong anterior barbs, which are most characteristic of *M. peronii*. The outline of the snout of *B. scaber* is concave.

32. Monacanthus brownii.

Aleuterius? brownii, *Richards. Voy. Ereb. & Terr. Fish.* p. 68.
? Monacanthus lineo-guttatus, *Hollard, Ann. Sc. Nat.* 1854, ii. p. 352.

D. 32–33. A. 30–31.

Skin minutely granular. Adult specimens with the sides of the tail covered with short, fine, setiform bristles, and with two pairs of strong, straight, conical spines. Body oblong, its depth being one-third of the total length (without caudal). Snout produced, with the upper profile convex. Dorsal spine of moderate strength, straight, much shorter than the snout, four-edged, each edge with a series of barbs. Caudal fin rounded; dorsal and anal fins low. Ventral spine none; abdominal edge trenchant. Green, with blue dots over the whole body; the spots are replaced by blue oblique and longitudinal lines on the side of the head and anterior part of the trunk. The part of the tail which is armed with bristles and spines is of an orange-colour. Fins green.

Australia.

a. Twelve inches long: stuffed.

33. Monacanthus spilomelanurus.

Balistes spilomelanurus, *Quoy & Gaim. Voy. Uran. Zool.* p. 217.
Aleuterius paragaudatus, *Richards. Voy. Ereb. & Terr. Fish.* p. 66, pl. 39. figs. 1–4; *Hollard, Ann. Sc. Nat.* 1854, ii. p. 357.

D. 30–32. A. 28–32.

Skin minutely granular. Adult specimens (males?) with a tooth-brush-like cluster of setiform spines on the side of the tail, between the dorsal and anal fins. Body oblong, its depth being about one-third of the total length (without caudal). Snout long, pointed, the upper profile being much more oblique than the lower. Dorsal spine of moderate strength, rather short, straight, four-edged, each edge with a series of barbs; the spine is inserted above the hinder part of the orbit. Caudal rounded; dorsal and anal fins of moderate height. Ventral spine very small, and in young examples absent. Brownish, with brown and light dots about the head and body; side of the body with dark undulated lines. Young examples with a narrow light line, edged with black above and below, from the snout through the lower part of the eye along the middle of the side; another brown line runs from one eye round the forehead to the other. Caudal fin with a vertical intramarginal black band, which also disappears in old examples.

Australia.

a. Adult (8 inches long), not in good state. From the Haslar Collection.
b. Young. Van Diemen's Land. From the Haslar Collection.—Type of *A. paragaudatus*.
c. Young: stuffed. Swan River.
d. Young. Port Lincoln. From the Collection of the Zoological Society.
e, f–h. Half-grown and young. Sydney. From Mr. Krefft's Collection.
i. Young: stuffed. Australia.

II. *Anal fin with* 40 (39) *or more rays. Ventral spine none*: Aluteres.

A. *Dorsal spine above the orbit.*

1. *Dorsal spine with distinct barbs.*

34. Monacanthus heudelotii.

Aluterus heudelotii, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 13.

D. 37. A. 41.

Skin finely velvety. Body oblong, its depth being one-third of the total length, without caudal fin, which is elongate, and one-fourth of the total. Snout with the upper profile straight. Dorsal spine large, armed with barbs in front and behind, situated above the orbit. Ventral spine none. Uniform brown. (*Hollard.*)

Senegal.

a. One and a half inch long. Congo expedition.

2. *Dorsal spine feeble, rough, but without barbs.*

35. Monacanthus monoceros.

Acara muca, *Willughby*, tab. E. 2. fig. 2.
Valent. fig. 310; *Renard*, i. pl. 4. fig. 24, ii. pl. 4. fig. 16.
Balistes, sp., *Gronov. Zoophyl.* no. 193.
Balistes monoceros, *Osbeck, It.* p. 110; *L. Syst. Nat.* i. p. 404; *Bl.* tab. 147; *Bl. Schn.* p. 462.
Capriscus, sp., *Klein, Pisc. Miss.* iii. p. 25. no. 8, tab. 3. fig. 11.
Lija barbuda, *Parra,* p. 48, lam. 22. fig. 2.
Balistes kleinii, *Gm. L.* p. 1472.
—— monoceros, var. unicolor, *Bl. Schn.* p. 463.
—— serraticornis, *Fréminv. Nouv. Bull. Sc. Soc. Philom.* no. 67, p. 249, tab. 4. fig. 1.
Aleuteres berardi, *Less. Voy. Coq. Zool.* p. 107, pl. 7; *Richards. Voy. Sulph. Ichth.* p. 132, pl. 61. fig. 1.
Alutera cinerea, *Schleg. Faun. Japon. Poiss.* p. 292, pl. 131. fig. 1.
? Balistes unicornu, *Basilewsky, Nouv. Mém. Soc. Nat. Mosc.* x. 1855, p. 263.
Alutarius macracanthus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 22, pl. 3. fig. 6.
—— amphacanthoides, *Bleek. l. c.* p. 23, pl. 2. fig. 5.
—— obliteratus, *Cant. Mal. Fish.* p. 353.
Balistes linguatula, *Gronov. Syst.* ed. *Gray,* p. 35.
Aluterus anginosus, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 11.
Alutera güntheriana, *Poey, Proc. Ac. Nat. Sc. Philad.* 1863, p. 184.
Aleuteres monoceros, *Bleek. Ned. Tyds. Dierk.* iii. 1865, p. 28; *Atl. Ichth.* v. p. 140, pl. 226. fig. 2.

D. 48. A. 50. Vert. 7/13.

Skin finely velvety. Body oblong, its depth being two-fifths or less than two-fifths of the total length (without caudal). Snout produced, with the upper profile convex. Dorsal spine feeble, above the middle of the orbit. Part of the gill-opening in advance of, pectoral fin below, the orbit. Caudal fin subtruncate, much shorter than the head; dorsal and anal fins low. Ventral spine none. Uniform brownish.

Atlantic parts of Tropical America; Indian Ocean and archipelago; Japan.

- *a*. Adult, 21 inches long: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
- *b*. Half-grown: skin. Pinang. From Dr. Cantor's Collection.—Type of *A. obliteratus*.
- *c*. Young. Pinang. From Dr. Cantor's Collection.
- *d*. Half-grown. Amboyna. Purchased of Hr. Frank.
- *e*. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *A. macracanthus*.
- *f*. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *A. amphacanthoides*.
- *g*. Half-grown: skin. China. Presented by J. R. Reeves, Esq.
- *h*. Adult: stuffed. Japan. Purchased of Hr. Frank.
- *i*. Half-grown: skeleton. Purchased.

36. Monacanthus convexifrons.

Aluterus convexifrons, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 10.

D. 43. A. 47.

Skin finely velvety. The depth of the body is two-fifths of the total length (without caudal). Snout with the upper profile convex; also the profile between the dorsal fins is curved. Dorsal spine above the middle of the orbit. Caudal fin short and rounded. Ventral spine none. Uniform brownish. (*Hollard.*)

Hab. —— ?

37. Monacanthus scriptus.

Valent. iii. p. 508, fig. 523; *Renard*, i. pl. 11. fig. 69; *Catesby, South Carol.* ii. tab. 19.
Capriscus, sp., *Klein, Pisc. Miss.* iii. p. 25. no. 10.
Balistes scriptus, *Osbeck, It.* i. p. 144.
Lija trompa, *Parra*, p. 46, lam. 22. fig. 1.
Balistes lævis, *Bl. Ausl. Fisch.* ix. p. 82, tab. 414.
Balistes monoceros, var. lævis, *Bl. Schn.* p. 463.
Alutarius lævis, *Cuv. Règne An.*; *Cant. Mal. Fish.* p. 355; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 22; *Hollard, Ann. Sc. Nat.* 1855, iv. p. 15; *Day, Fish. Malab.* p. 259.
Balistes ornatus, *Marion de Procé, Bull. Philom.* 1822, p. 131.
Aluteres pareva, *Less. Voy. Coq. Zool.* p. 106.
Monacanthus proboscideus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* v. 1842, p. 8.
Aleuteres lævis, *Richards. Voy. Sulph. Ichth.* p. 131, pl. 61. fig. 3.
Aluterus venosus, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 14, pl. 1. fig. 3.
Alutera picturata, *Poey, Proc. Ac. Nat. Sc. Philad.* 1863, p. 183.
Aluteres scriptus, *Bleek. Ned. Tyds. Dierk.* iii. 1865, p. 28; *Atl. Ichth.* v. p. 141, pl. 227. fig. 4.

D. 44–48. A. 47–52.

Skin finely velvety. Body oblong, its depth being nearly equal to the distance of the hind margin of the orbit from the extremity of the snout, and one-third, or somewhat more or less than one-third, of the total length (without caudal). Snout produced, *with the upper* *profile concave.* Dorsal spine very feeble, above the middle of the orbit. Part of the gill-opening in advance of, pectoral fin below, the orbit. Caudal fin elongate, nearly as long as or longer than the head, rounded; dorsal and anal fins low. Ventral spine none. Head and body with irregular blue spots and lines, and small round black spots.

Vert. 7/14.

Tropical and subtropical seas.

a. Adult. Cape Verde Islands. Presented by the Rev. R. T. Lowe.
b–c. Adult, 26 inches long: stuffed. West Indies. Purchased of Mr. Scrivener.
d. Adult: skin. Jamaica. Purchased of Mr. Parnell.
e. Young. South America.
f. Half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.
g. Half-grown: skin. Zanzibar. From Lieut.-Col. Playfair's Collection.
h. Young: skin. Pinang. From Dr. Cantor's Collection.
i. Young. Amboyna. Purchased of Hr. Frank.
k. Young. Siam. Purchased of Mr. Jamrach.
l, m, n–p. Adult, half-grown, and young.
q. Adult: stuffed.
r. Adult: skeleton. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

Balistes liturosus, Shaw, Gener. Zool. v. p. 405, is described thus: —Length nearly two feet: habit long and slender: colour jet-black, with numerous, abrupt, blue streaks in an obliquely longitudinal direction: fins and tail white; a blue bar across the latter; under jaw longer than the upper: over the eyes a very long, slender, black spine: along each side of the head, from the eyes to the mouth, a narrow white stripe: eyes yellow. Native of the Indian seas: observed about the coasts of Otaheitee by Captain G. Tobin.

38. Monacanthus personatus.

Aluteres personatus, *Less. Voy. Coq. Zool.* ii. p. 105; *Bleek. Ned. Tyds. Dierk.* 1865, iii. p. 29.

D. 46. A. 48–50.

Skin finely velvety. Body oblong, its depth being less than one-half of the total length, without caudal, which is one-third of the total length. Snout pointed, with the upper profile concave. Dorsal spine above the orbit. Ventral spine none. Head black; mouth light greyish. A long blackish blotch on the back; another, rounded, near the caudal fin, and two larger oblique spots on the sides. Caudal fin black with white stripes. (*Less.*)

New Guinea.

Length of specimen 6 inches, of caudal fin 2 inches.

39. Monacanthus aurantiacus.

Balistes aurantiacus, *Mitch. Lit. & Phil. Trans. N. York*, i. p. 468, pl. 6. fig. 1.

Monacanthus aurantiacus, *Dekay, New York Faun. Fish.* p. 333, pl. 57. fig. 186; *Storer, Mem. Am. Acad.* viii. 1861, p. 423 (pl. 34. fig. 3).

? Aluterus cultrifrons, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 8, pl. 1. fig. 2.

D. 36. A. 39.

Skin finely velvety. Body oblong, its depth being two-fifths of the total length (without caudal) [*Mitchill, Hollard*]. Snout moderately produced, with the upper profile concave; eye situated at some distance below the upper profile. Dorsal spine rather feeble, above the middle of the orbit. Part of the gill-opening in advance of, pectoral fin below, the orbit. Caudal fin not elongate; dorsal and anal fins low. Ventral spine none. Orange-coloured, marbled with whitish.

New York.

40. Monacanthus punctatus.

Alutera punctata, *Agass. in Spix, Pisc. Bras.* p. 137, tab. 72.

D. x. A. 40.

The height of the body is contained twice and one-fifth in the total length (without caudal). Snout somewhat pointed, with the upper profile concave. Dorsal spine rather slender, curved. Gill-opening below the eye. Caudal fin rounded; dorsal and anal fins rather low. Ventral spine none. Blackish, with black dots. (*Agass.*)

Brazil.

B. *Dorsal spine in advance of the orbit.*

41. Monacanthus nasicornis.

Alutera nasicornis, *Schleg. Faun. Japon. Poiss.* p. 223, pl. 131. fig. 2; *Bleek. Nat. Tyds. Ned. Ind.* v. p. 352.

Aluterus rhinoceros, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 19, pl. 1. fig. 5.

Pseudaluteres nasicornis, *Bleek. Ned. Tyds. Dierk.* iii. 1865, p. 28, and *Atl. Ichth.* v. p. 139, pl. 221. fig. 1, and pl. 224. fig. 2.

D. 43. A. 41.

Body covered with minute, rough scales, oblong, its depth being one-third of the total length (without caudal). Snout rather obtuse, with the upper profile convex. Dorsal spine nearly as long as the head, straight, without barbs, inserted in advance of the orbit. Gill-opening below the hinder part of the orbit; pectoral fin behind it. Caudal fin shortly rounded; dorsal and anal fins low. Ventral spine none. A brownish band runs from the eye to the upper part of the root of the caudal. Lower parts with numerous small white dots.

Indian Ocean and archipelago; Japan.

a. Adult ($5\frac{1}{2}$ inches long): skin. Zanzibar. From Lieut.-Col. Playfair's Collection.

b, c. Adult. Amboyna.

6. ANACANTHUS.

Anacanthus, *Gray, Zool. Misc.* 1831, p. 8.
Pogonognathus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 23.
Psilocephalus, (*Swains.*) *Bleek. Ned. Tyds. Dierk.* 1866, iii. p. 14.

Body compressed, elongate, covered with minute asperities. Dentition as in *Monacanthus*. The first dorsal fin reduced to a single feeble spine. Ventral fins none. Lower jaw with a fleshy barbel. Vertebræ 29–30.

East-Indian archipelago.

1. Anacanthus barbatus.

Balistes (Anacanthus) barbatus, *Gray, Ind. Zool.* c. fig., and *Zool. Misc.* 1831, p. 8.
Alutarius barbatus, *Cant. Mal. Rept.* p. 357, pl. 8. fig. 1.
Pogonognathus barbatus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 24, pl. 5. fig. 11.
Aluterus barbatus, *Hollard, Ann. Sc. Nat.* 1855, iv. p. 17, pl. 1. fig. 4.
Psilocephalus barbatus, (*Swains.*) *& Bleek. Atl. Ichth. Balist.* p. 143, pl. 226. fig. 1.

D. 1 | 44–51. A. 59–65.

The height of the body is two-fifths of the length of the head, which is two-fifths of the total (without caudal). Caudal fin much elongate, longer than the head. Dorsal spine very feeble, setiform, above the hind margin of the orbit.

East-Indian archipelago.

a. Several specimens: skins. Pinang. From Dr. Cantor's Collection.
b, c. Adult and young.

Third Group. OSTRACIONTINA.

7. OSTRACION.

Ostracion, *Artedi, Genera,* p. 55; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 121 *et seqq.*

The integuments of the body are modified into a carapace composed of juxtaposed hexagonal osseous scutes, the snout, bases of the fins, and hind part of the tail being covered by soft skin. Mouth small, maxillary and intermaxillary bones coalescent, each jaw with a single series of small slender teeth. One short dorsal fin (without spine) opposite to the short anal. Ventral fins none. Vertebræ 14, the five last extremely short, the anterior elongate; ribs none.

The species may be referred to two subgenera:—

α. *Carapace closed behind the anal fin*: Ostracion, p. 256.
β. *Carapace open behind the anal fin*: Aracana, p. 266.

a. OSTRACION.

Ostracion, Lætophrys, Tetrosomus, *et* Acanthostracion, *Swainson & Bleeker*, *Ned. Tyds. Dierk.* iii. p. 15.
Cibotion, Lætophrys, and Ostracion, *Kaup, Wiegm. Arch.* 1855, p. 215.

Carapace closed behind the anal fin.
Seas of the tropical and subtropical regions.

The species may be arranged thus:—

I. Carapace three-ridged, p. 256.
II. Carapace four- or five-ridged, without spines, p. 260.
III. Carapace four-ridged, with spines, p. 264.

I. *Carapace three-ridged.*

1. **Ostracion triqueter.**

Willughby, App. p. 20, tab. J. 18.
Ostracion, sp., *Artedi, Synon.* p. 85. no. 14; *Gen.* p. 57. no. 10.
Seba, iii. tab. 24. figs. 6 & 12.
Ostracion triqueter, *L. Syst. Nat.* i. p. 407; *Bl.* tab. 130; *Bl. Schn.* p. 498; *Lacép.* i. p. 444; *Müll. & Trosch. in Schomburgk's Barbadoes,* p. 677; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 154; *Poey, Repert. Fis.-nat. Cub.* ii. p. 442.

Carapace three-ridged, without spines on any portion, forming a continuous bridge across the back of the tail behind the dorsal fin. Interorbital space concave; upper profile of the snout concave. Body and tail covered with small white spots nearly as large as the pupil of the eye. Lips, roots of the fins, root of the tail, and margin of the caudal black. Abdomen whitish, immaculate.

West Indies.

a. Several half-grown specimens: skins. Jamaica. Purchased of Mr. Parnell.
b. Half-grown: skin. Trinidad. Presented by J. B. Richardson, Esq.
c. Half-grown. Cayenne.
d–f. Half-grown. West Indies. Purchased of Mr. Scrivener.
g. Several adult (10 inches), half-grown, and young examples: skins. West Indies.
h, i, k, l. Several half-grown and young examples.
m. Several adult (12 inches) and half-grown examples: skins.

2. **Ostracion trigonus.**

Willughby, App. p. 20, tab. J. 13. fig. 2.
Ostracion, sp., *Artedi, Synon.* p. 85. no. 11; *Gen.* p. 57. no. 7.
Seba, iii. t. 24. f. 3.
Chapin, *Parra,* p. 31, lam. 17. fig. 1.
Ostracion trigonus, *L. Syst. Nat.* p. 408; *Bl.* taf. 135; *Bl. Schn.* p. 499; *Lacép.* i. p. 465; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 150.
—— yalei, *Storer, Bost. Journ. Nat. Hist.* i. p. 353, pl. 8.
Lactophrys yalei, *Dekay, New York Fauna, Fish.* p. 362; *Storer, Mem. Am. Ac.* viii. 1861, p. 429 (pl. 35. fig. 3).

Lactophrys oviceps, *Kaup, Wiegm. Arch.* 1855, p. 218.
Lætophrys trigonus, *Poey, Rep. Fis.-nat. Cuba*, ii. p. 441.
—— undulatus, *Poey, l. c.*

Carapace three-ridged, with a flat prominent spine on each abdominal ridge; this spine is opposite to or but slightly in advance of the root of the dorsal fin. No other spines. The carapace is not continuous behind the dorsal fin, the back of the tail being covered by a single osseous shield. Interorbital space concave; anterior profile of the snout very steep and nearly straight. Caudal fin subtruncate. Carapace and tail with some scattered small whitish spots. Young examples with a black blotch behind the gill-opening and on the middle of the side.

West Indies.

a–c. Half-grown and young. St. Croix. Purchased of Mr. Stevens.
d–e. Adult and half-grown: skins. Jamaica. Purchased of Mr. Parnell.
f. Several adult (18 inches), half-grown, and young examples: skins.

3. Ostracion bicaudalis.

Willughby, Append. p. 20, pl. J. 17.
Ostracion, sp., *Artedi, Synon.* p. 85. no. 12; *Gen.* p. 57. no. 8.
Seba, iii. tab. 24. fig. 7.
Ostracion bicaudalis, *L. Syst. Nat.* i. p. 408; *Bl.* taf. 132; *Bl. Schn.* p. 499; *Lacép.* i. p. 465; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 153; *Poey, Repert. Fis.-nat. Cub.* ii. p. 442.

Carapace three-ridged, with a flat prominent spine on each ventral ridge; this spine is opposite to or but slightly in advance of the root of the dorsal fin. No other spines. The carapace forms a continuous bridge across the back of the tail, behind the dorsal fin. Interorbital space concave. Hind margin of the caudal fin rounded. Carapace, tail, and caudal fin with numerous small, round, brown spots (from five to nine on each hexagonal plate).

West Indies.

a. Half-grown. Belize. From Mr. Salvin's Collection.
b. Adult. Jamaica. Purchased of Mr. Higgins.
c–f. Half-grown: skins. Jamaica. Purchased of Mr. Parnell.
g. Several adult (17 inches), half-grown, and young examples: skins. West Indies.
h. Very young. Island of Ascension. Presented by Mr. J. Robinson.
i. ? Adult. From the Collection of Dr. van Lidth de Jeude.

4. Ostracion quadricornis.

Willughby, Append. p. 19, tab. J. 15 (spine on tail placed too much backwards), and p. 20, tab. J. 14.
Ostracion, sp., *Artedi, Synon.* p. 85. nos. 9 & 10; *Gen.* p. 56. nos. 5 & 6.
Ostracion tricornis, *L. Syst. Nat.* i. p. 408; *Bl. Schn.* p. 499.
—— quadricornis, *L. Syst. Nat.* i. p. 409; *Bl.* taf. 134; *Bl. Schn.*

p. 499; *Lacép.* i. p. 468; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 148; *Poey, Repert. Fis.-nat. Cuba*, ii. p. 439.
Ostracion lister, *Lacép.* i. p. 468, pl. 23. fig. 2 (cop. *Willughby*).
—— sex-cornutus, *Mitchill, Amer. Monthly Mag.* ii. p. 328.
Lactophrys sexcornutus, *Storer, Mem. Am. Ac.* ii. p. 498.
Ostracion maculatus, *Hollard, l. c.* p. 149.
—— quadricornis, tricornis, guineensis, gronovii *et* notacanthus, *Bleek. Ned. Tyds. Dierk.* ii. p. 298; *Verhand. Holl. Maatsch. Haarlem*, 1862, *Guinea*, p. 20.
—— (Acanthostracion) quadricornis, *Bleek. Atl. Ichth.* v. p. 32.

Carapace three-ridged, with a flat prominent spine on each ventral ridge opposite to the dorsal fin, and with a pair of horizontal conical supraorbital spines pointing straight forwards. Sometimes a spine in the middle of the dorsal ridge. The carapace forms a continuous bridge across the back of the tail, behind the dorsal fin, and frequently, especially in young specimens, terminates in a median spine. Interorbital space deeply concave. Caudal fin long, much longer than the head, the rays being much branched. Each scute of the carapace with a bluish spot or ring, or with a light, brown-edged ocellus; sometimes the ocelli or brown edges of several scutes confluent, and forming irregular wavy markings. Cheeks with reticulated brown lines or four or five parallel horizontal brown bands.

Tropical parts of the Atlantic.

a. Young. West Africa. From the Collection of Mrs. Burton.
b. Half-grown. St. Croix. Purchased of Mr. Stevens.
c. Several half-grown and young examples: skins. Jamaica. Purchased of Mr. Parnell.
d. Half-grown. San Domingo. Purchased of Mr. Cuming.
e, *f–g*, *h–i*. Half-grown. Bahia. From Dr. Wucherer's Collection.
k. Many adult, half-grown, and young examples: skins. West Indies.
l. Many adult (16 inches), half-grown, and young examples: skins. Habitat —— ?
m, *n–o*. Half-grown.

Variety with dorsal spine (O. notacanthus, *Bleek.*).

p–q. Half-grown. St. Helena. Presented by J. C. Melliss, Esq.

This form deserves to be distinguished as a variety, although examples from the West Indies with an indication of the dorsal spine are by no means uncommon. The other species proposed by Dr. Bleeker cannot be maintained even as varieties.

5. Ostracion gibbosus.

Ostracion alter, *Aldrov.* iv. p. 561 (cop. by *Jonston*, tab. 25. fig. 6, and by *Willughby*, tab. J 9. fig. 1).
Ostracion, sp., *Artedi, Synon.* p. 83. no. 2, and *Genera*, p. 55. no. 2.
Ostracion gibbosus, *L. Syst. Nat.* i. p. 409.
Valent. pp. 396, 425, figs. 159, 262; *Ruysch*, p. 9, tab. 5. figs. 5, 9; *Renard*, ii. tab. 6. fig. 24, tab. 9. fig. 46.

Crayracion, sp., *Klein, Pisc. Miss.* iii. p. 20. no. 17.
Ostracion turritus, *Forsk. Descr. An.* p. 75. no. 113; *Bl. Ausl. Fisch.* i. p. 113, taf. 136; *Bl. Schn.* p. 500; *Lacép.* i. p. 470; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 31, and *Act. Soc. Sc. Indo-Neerl.* vii. *Japan*, vi. p. 13; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 156.
Lactophrys camelinus, *Dekay, New York Faun. Fish.* p. 341, pl. 58. fig. 190.
Ostracion (Tetrosomus) turritus, *Bleek. Atl. Ichth. Ostrac.* p. 31, pl. 3. fig. 3.

Carapace three-ridged, the dorsal ridge passing into a very large, compressed, elevated, triangular spine. Each ventral ridge with four small flat spines pointing backwards. Supraorbital edge with a small spine pointing backwards and outwards. The carapace forms a broad continuous bridge across the back of the tail. Interorbital space concave. Caudal fin rounded. During life a bluish spot in the centre of each scute.

Indian Ocean and archipelago. (?? New York.)

a. Adult: skin. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Adult (9 inches): skin. Persian Gulf. Presented by Dr. Leith.
c–d. Adult and half-grown. East-Indian archipelago.
e. Young. Borneo. Presented by Vice-Admiral Sir E. Belcher.
f–g. Half-grown: skins. India. Purchased of Mr. Warwick.
h. Adult.

6. Ostracion concatenatus.

Ostracion concatenatus, *Bl.* taf. 131 (adult); *Bl. Schn.* p. 498; *Lacép.* i. p. 454; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 155.
—— stellifer, *Bl. Schn.* p. 499, pl. 98 (young).
—— bicuspis, *Blumenbach, Abbild.* taf. 58; *Smith, Ill. Zool. S. Afr. Pisc.* pl. 18.

Very closely allied to, and probably identical with, *O. gibbosus*.

Carapace three-ridged, forming a broad continuous bridge across the back of the tail. Dorsal ridge with two compressed small spines placed close together; each ventral ridge with two similar spines remote from each other. Supraorbital edge with a very small or minute spine, pointing backwards and outwards; it is frequently absent, sometimes double. All these spines become less prominent with age, and only traces of them can be discovered in adult examples (8–10 inches). Interorbital space concave. Adult examples with some horizontal dark stripes on the cheek.

Cape of Good Hope; Chinese Seas; ? Australia.

a–d. Adult (10 inches) and half-grown: skins. Cape of Good Hope.
e. Very young. Zanzibar. From Dr. Kirk's Collection.
f–g. Young. ? Siam. Purchased of Mr. Jamrach.
h. Adult: carapace. New South Wales. From the Fort-Pitt Collection.
i. A great number of half-grown and young examples: skins. Chinese Sea.

II. *Carapace four- or five-ridged, without spines.*

7. Ostracion cubicus.

Ostracion prior, *Aldrov.* iv. c. 19, p. 560; *Jonston*, p. 125, tab. 25, fig. 7.

Willughby, Append. p. 20, tab. J. 10 and J. 12; *Valent.* p. 386, fig. 120; *Seba*, iii. tab. 24. fig. 11.

Ostracion, sp., *Artedi, Synon.* p. 85. no. 8, and p. 84. no. 6; *Genera*, pp. 55, 56. nos. 1 & 4; *Gronov. Mus.* i. p. 54. no. 119; *Zoophyl.* p. 44. no. 173.

Ostracion tetragonus, *L. Mus. Ad. Fred.* p. 59; *Bleek. Atl. Ichth. Ostrac.* p. 39, pl. 1. fig. 2, and pl. 3. fig. 2; *Günth. in Fish. Zanz.* p. 129; *Day, Fish. Malab.* p. 254.

—— tuberculatus, *L. Syst. Nat.* i. p. 409.

—— cubicus, *L. l. c.* p. 410; *Bloch, Ausl. Fisch.* i. p. 115, taf. 137; *Lacép.* i. p. 461, pl. 22. fig. 1; *Rüpp. Atlas, Fisch.* p. 3; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 35, pl. 7. fig. 14; *Lefebr. Voy. Poiss.* p. 238, pl. 8; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 162.

Abu senduk, *Forsk. Descr. An.* p. 17. no. 48.

Ostracion deux-tubercules, *Lacép.* i. p. 459.

—— bituberculatus, *Bl. Schn.* p. 501.

—— cyanurus, *Rüpp. Atl. Fische*, p. 4, taf. 1. fig. 2; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 167.

—— argus, *Rüpp. l. c.* fig. 1.

? Ostracion maculatus, *Quoy & Gaim. Voy. Uran. Zool.* p. 218.

Ostracion immaculatus, *Schleg. Faun. Japon. Poiss.* p. 296; *Bleek. Nat. Ichth. Japan*, p. 55; *Brevoort, Not. Jap. Fish.* p. 284.

—— tesserula, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 305.

Carapace four-ridged, without spines, forming a broad continuous bridge across the back of the tail. Ridges rather blunt. Back slightly convex, without raised ridge in the median line. Interorbital space concave. Snout with a hump immediately above the mouth, in very old examples. Body with bluish black-edged ocelli, not more than one on a scute; but frequently the ocelli are absent on the abdomen or head, or on a portion of the sides or back. Head, sides, and abdomen frequently with black dots. Tail immaculate, or with black, never with white, dots. *Young* with scattered large black dots.

Indian Ocean and archipelago; Australia.

Var. a. Abdominal scutes with whitish ocelli, with or without black dots.

a. Adult (15 inches long). Red Sea. Purchased of Mr. Jesse.

b–c. Adult and half-grown. Zanzibar.

d–f. Half-grown and young: skins. Zanzibar. From Lieut.-Col. Playfair's Collection.

g–h. Adult. Seychelles. From Prof. E. P. Wright's Collection.

i, k–m. Half-grown and young. Mauritius. From the Collection of the Zoological Society.

n. Half-grown: skin. From Sir A. Smith's Collection.

Var. β. Abdomen without whitish ocelli, immaculate or with black dots.

o. Adult (15 inches): skin. Ceylon. From Dr. Kelaart's Collection.
p–r. Half-grown and young. Amboyna. Purchased of Hr. Frank.
s. Half-grown. Ceram. Purchased of Mr. Stevens.
t–u. Young: skins. South Australia. Purchased.
v. Half-grown.
w–x. Adult: skins.

8. Ostracion sebæ.

Ostracion sebæ, *Bleek. Verh. Bat. Gen.* xxiv. *Bal.* p. 32, tab. 6. fig. 13, or *Nat. Tyds. Ned. Ind.* ii. p. 259, or *Atl. Ichth. Ostrac.* p. 41, pl. 4. fig. 2.
—— bombifrons, *Hollard, Ann. Sc. Nat.* 1857, vii. p. 168.

Carapace four-ridged, without spines, forming a broad continuous bridge across the back of the tail. Ridges blunt. Back convex, without raised ridge in the median line. Interorbital space flat; anterior profile of the snout convex. Body, sides, and tail with whitish, dark-edged ocelli, more numerous than the scutes. An irregular whitish band runs along each dorsal ridge and the upper part of the tail to the root of the caudal fin. An irregular whitish cross band between the orbits. Head immaculate.

Indian Ocean and archipelago.

a–b. Adult (8 inches): skins. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Type of the species. East-Indian archipelago. From Dr. Bleeker's Collection.
d. Adult. Amboyna. Purchased of Hr. Frank.
e. Adult. Java. Purchased of Mr. Jamrach.
f. Adult. From the Collection of the Zoological Society.
g. Adult: skin. From the Collection of the Zoological Society.

9. Ostracion punctatus.

Seba, iii. tab. 24. fig. 5.
Crayracion, sp., *Klein, Pisc. Miss.* iii. p. 21. no. 25, tab. 1. fig. 8.
Ostracion pointillé, *Lacép.* i. pp. 442, 445, pl. 21. fig. 1.
—— punctatus, *Bl. Schn.* p. 501; *Cuv. Règne An.*; *Jenyns, Zool. Beagle, Fish.* p. 158; *Bleek. Nat. Tyds. Ned. Ind.* xi. p. 108, and *Atl. Ichth. Ostrac.* p. 39, pl. 2. fig. 4; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 165.
—— lentiginosus, *Bl. Schn.* p. 501.
—— meleagris, *Shaw, Zool.* v. p. 428, pl. 172, and *Zool. Misc.* pl. 253.

Carapace four-ridged, without spines, forming a broad continuous bridge across the back of the tail. Ridges blunt. Back convex, without raised ridge in the median line. Interorbital space flat; anterior profile of the snout concave. All parts covered with very numerous and small white dots, some of them confluent into undulated lines.

Indian Ocean and archipelago; Pacific.

a–b. Adult ($6\frac{1}{2}$ inches): skins. Zanzibar. From Lieut.-Col. Playfair's Collection.

c. Adult. Madagascar. Presented by Dr. J. E. Gray.
d. Adult: skin. Ceylon. From Dr. Kelaart's Collection.
e. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
f–g. Adult. Pacific. Voyage of H.M.S. 'Herald.'
h–k. Adult, half-grown, and young. Pacific. From Cook's voyage.—Types of *O. meleagris*.

10. Ostracion renardi.

Bleek. Act. Soc. Indo-Neerl. i. *Amboyna*, p. 68 (not synon.); *Atl. Ichth. Ostrac.* p. 41, pl. 2. fig. 6.

Carapace four-ridged, without spines, forming a continuous bridge across the back of the tail. Ridges sharp. Back flat; interorbital space slightly concave. Back minutely punctulated with blue; sides and abdomen with bluish dark-edged ocelli. Two bluish lines run from the eye, below the dorsal ridge, to the root of the tail; a bluish line crosses the forehead; a horizontal bluish black-edged band on the cheek along a cutaneous fold; a similar vertical band from the eye to the gill-opening. Tail with reticulated bluish lines; caudal fin with black dots.

Amboyna and Ceram; Java.

a. Type of the species, 4 inches long. Amboyna. From Dr. Bleeker's Collection.
b. Four and a half inches long. Amboyna. Purchased of Hr. Frank.
c. Four and a half inches long. Java. Purchased of Mr. Jamrach.

11. Ostracion solorensis.

Bleek. Nat. Tyds. Ned. Ind. v. p. 96, and *Atl. Ichth. Ostrac.* p. 42, pl. 2. fig. 4.

Carapace four-ridged, without spines, forming a continuous bridge across the back of the tail. Ridges sharp. Interorbital space and back flat. Back minutely punctulated with blue. Sides of the carapace and tail with bluish reticulated lines. Snout, side of the head, and abdomen with small brown spots. Three or four undulated bluish lines run from the eye towards the end of the carapace. Caudal fin with black dots.

East-Indian archipelago.

a. Adult, 4½ inches long. East Indian archipelago. From Dr. Bleeker's Collection.—One of the typical specimens.
b. Adult. Java. Purchased of Mr. Jamrach.
c. Adult. Amboyna. Purchased of Hr. Frank.
d. Half grown. From the Collection of the Zoological Society.

12. Ostracion ornatus.

Hollard, Ann. Sc. Nat. 1857, vii. p. 166.

Carapace four-ridged, without spines. A more or less pointed protuberance in front of the dorsal fin, from which several raised lines radiate. Interorbital space concave. Sides and back punctulated with white, abdomen with brown. Two light brown-edged bands on the side: one, which is the broader and more constant, proceeds from the lower part of the gill-opening; the other is close to the dorsal ridge. Sometimes the lower band advances on the cheek, where it is bifurcate, one part crossing the forehead. Sometimes all the dots are brown. (*Hollard.*)

Marquesas Islands.

13. Ostracion nasus.

Ostracion nasus, *Bl. Ausl. Fisch.* i. p. 118, taf. 138; *Bl. Schn.* p. 500; *Lacép.* i. p. 458; *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 33, tab. 7. fig. 15, and *Atl. Ichth. Ostrac.* p. 36, pl. 4. fig. 2, and pl. 2. fig. 5; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 161; ? *Day, Fish. Malab.* p. 253.
—— tesserula, *Cant. Mal. Fish.* p. 367, pl. 8. figs. 2 & 3.

Carapace five-ridged, without spines, forming a broad continuous bridge across the back of the tail. A very distinct ridge runs along the median line of the back. All the ridges rather sharp. Interorbital space deeply concave, the superciliary edge being granulated and passing into the lateral dorsal ridge. Snout with the anterior profile concave, and with a more or less developed hump immediately above the mouth. Body and tail with irregularly scattered round black spots, each of the size of the pupil of the eye. Abdomen white.

East-Indian archipelago; Pacific.

a, *b*–*c*. Young. Pinang. From Dr. Cantor's Collection.—Types of *O. tesserula*.
d–*e*. Adult ($8\frac{1}{2}$ inches) and half-grown: skins. Pacific. Voyage of H.M.S. 'Herald.'
f–*h*. Half-grown: skins.

14. Ostracion rhinorhynchus.

Willughby, Append. p. 20, tab. J. 11; *Seba,* iii. tab. 24. fig. 4.
Ostracion, sp., *Artedi, Synon.* p. 84. no. 7; *Genera,* p. 56. no. 3; *Gronov. Mus.* i. p. 54. no. 120, and *Zoophyl.* p. 24. no. 174.
Ostracium nasus, *Cant. Mal. Fish.* p. 369 (not *Bl.*).
Ostracion rhinorhynchus, *Bleek. Verh. Bat. Gen.* xxiv. *Balist.* p. 34, pl. 6. fig. 12; *Atl. Ichth. Ostrac.* p. 37, pl. 1. fig. 1, and pl. 3. fig. 1.

Carapace four-ridged, without spines, forming a continuous bridge across the back of the tail. The median line of the back is distinctly raised. Interorbital space very slightly concave. Snout with a hump which, in adult examples, is but little below the level of the forehead. Back and tail, and sometimes the sides, with numerous small brown dots (2–10 on one scute). Abdomen immaculate.

East-Indian archipelago; Australia.

a–*b*. Half-grown: skins. Pinang. From Dr. Cantor's Collection.
c. Adult (11 inches). East-Indian archipelago. From Dr. Bleeker's Collection.—Type of the species.

d–e. Adult and half-grown: skins. Australia. Presented by the Earl of Derby.

f. Half-grown: skin. North-west Australia. Purchased of Mr. Duboulay.

III. *Carapace four-ridged, with spines.*

15. Ostracion diaphanus.

? Ostracion, sp., *Gronov. Zoophyl.* p. 45. no. 176.
Ostracion diaphanus, *Bl. Schn.* p. 501; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 38; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 157.
—— brevicornis, *Schleg. Faun. Japon. Poiss.* p. 297, tab. 130. fig. 3.
—— undecim-aculeatus, *Smith, Ill. Zool. S. Afr.* pl. 17; *Casteln. Mém. Poiss. Afr. Austr.* p. 78.
—— pentacornis, *Bennett, Whaling Voyage*, p. 266.
Lætophrys diaphanus, *Kaup, Arch. Ntrgesch.* 1855, p. 217.
Ostracion (Acanthostracion) cornutus, *Bleek. Atl. Ichth. Ostrac.* p. 33, pl. 2. fig. 2, and pl. 4. fig. 3 (not *L.*, see *Peters, Monatsber. Ak. Wiss. Berl.* 1868, p. 461).

Carapace four-ridged; the broad bridge across the back of the tail is formed by *four* transverse series of scutes. A pair of short conical spines *divergent*, and pointing forwards in front of the orbits. A triangular compressed spine in the middle of the back; generally a small spine on each dorsal ridge, opposite to the central spine. Ventral ridge terminating behind in a strong flat spine, and frequently with two other smaller spines on the side. Interorbital space deeply concave. Caudal fin of moderate length. Sometimes of uniform coloration, sometimes with bluish, sometimes with black spots.

From the Cape of Good Hope to Japan and Australia.

a–c. Adult (8½ inches), half-grown, and young: skins. Cape of Good Hope.—Types of *O. undecim-aculeatus*.

d. Adult. Japan. Purchased of Mr. Jamrach.

e. Young. Japan.

f–h. Young. Pacific.

i–m. Adult: skins.

n. Young. Presented by G. Bennett, Esq.

16. Ostracion fornasini.

Ostracion fornasini, *Bianc. in Mem. Accad. Sc. Bologn.* vi. p. 151, pl. 1. fig. 1; *Günth. in Fish. Zanz.* p. 129.
—— cornutus, var., *Peters, Wiegm. Arch.* 1855, p. 278.
Lætophrys fornasini, *Kaup, Wiegm. Arch.* 1855, p. 217.
Ostracion pentacanthus, *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboyna*, viii. p. 98.
—— (Acanthostracion) fornasini, *Bleek. Atl. Ichth. Ostrac.* p. 34, pl. 3. fig. 4.

Carapace four-ridged, the bridge across the back of the tail formed by *three* transverse series of scutes only. A pair of short conical spines pointing forwards, *parallel or slightly convergent* in front of the orbits. A large triangular compressed spine in the middle of the back; no spine on the lateral dorsal ridge. Ventral ridge terminating behind in a strong claw-like spine, but without other spines. Interorbital space deeply concave. Caudal fin of moderate length. Body with irregular bluish and blackish markings.

Indian Ocean and archipelago.

a. Adult (5 inches long): skin. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Adult. Mozambique. Presented by Dr. Livingstone.
d. Adult. Amboyna. From Dr. Bleeker's Collection.—Type of *O. pentacanthus*.
e. Half-grown: skin.

17. Ostracion cornutus.

Willughby, Append. p. 20. no. 12, tab. J. 13. fig. 1; *Valent.* pp. 358, 451, 455, 461, figs. 36, 333, 344, 367; *Ruysch*, pp. 9, 10, 17, tab. 5. figs. 8 & 20; tab. 9. fig. 8; *Renard*, i. tab. 39. fig. 197, ii. tab. 8. fig. 38, tab. 13. fig. 60, tab. 27. fig. 135; *Seba*, iii. tab. 24. figs. 8, 9, & 13.
Crayracion no. 26, *Klein, Pisc. Miss.* iii. p. 22.
Ostracion, sp., *Gronov. Mus.* i. p. 54. no. 118; *Zoophyl.* p. 45. no. 175.
Ostracion cornutus, *L. Syst. Nat.* i. p. 409; *Bloch*, i. p. 105, tab. 133; *Bl. Schn.* p. 500; *Lacép.* i. p. 470; *Shaw, Zool.* v. p. 223, tab. 170; *Schleg. Faun. Japon. Poiss.* p. 299, tab. 131. fig. 4; *Bleek. Verh. Bat. Gen.* xxv. *Balist.* p. 32; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 158; *Peters, Monatsb. Ak. Wiss. Berl.* 1868, p. 460.
—— arcus, *Bl. Schn.* p. 502.
Ostracium cornutum, *Cant. Mal. Fish.* p. 365.
Ostracion valentini, *Bleek. Journ. Ind. Archipel.* 1848.
—— (Acanthostracion) arcus, *Bleek. Atl. Ichth. Ostr.* p. 35, pl. 2. fig. 3, pl. 4. fig. 4.

Carapace four-ridged, forming a broad bridge across the back of the tail. A long conical spine above each orbit, pointing forwards. Each ventral ridge terminates behind in a similar long spine pointing backwards. Each dorsal ridge with a slight prominence in the middle of its length, but it is not developed into a spine. Median line of the back slightly raised, without spine. Interorbital space deeply concave. Caudal fin very long in adult examples, with simply bifid rays. Carapace and tail with round bluish and blackish spots in moderate number, of the size of the pupil of the eye.

Indian Ocean and archipelago; Micronesia.

a–b. Half-grown. Port Natal. Purchased of Mr. Ayres.
c–d. Adult and half-grown: skins. Zanzibar. From Lieut.-Col. Playfair's Collection.
e, f. Young. Zanzibar.
g. Young. Seychelles. From Prof. E. P. Wright's Collection.
h. Young: skin. Indian Ocean. Presented by Sir A. Smith.
i, k–l. Young. Pinang. From Dr. Cantor's Collection.
m, n, o. Half-grown. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.

p, *q*. Several examples, adult, half-grown, and young. Amboyna. Purchased of Hr. Frank.

r. Half-grown. Siam. Purchased of Mr. Jamrach.

s. Adult: skin. India. Purchased of Mr. Warwick.

t, *u*, *v*. Half-grown and young. China.

w. Adult: skin. Island of Nairai (Feejee Islands). Voyage of H.M.S. 'Herald.'

x–y. Half-grown. Micronesia. Purchased of Mr. Wright. Very young. New Guinea. Presented by Mrs. Stanley.

z, *α*, *β*, *γ–δ*, *ε–ζ*. Adult (14 inches long), half-grown, and young.

η–κ. Adult, half-grown, and young: skins.

β. ARACANA.

Aracana, *Gray*, *Ann. Nat. Hist.* i. p. 110.

Acerana, Capropygia, Kentrocapros, *et* Anoplocapros, *Kaup*, *Wiegm. Arch.* 1855, p. 219.

Carapace not closed behind the anal fin.

Japanese and Australian seas.

1. **Aracana aculeata.**

Ostracion aculeatus, *Houttuyn*, *Verh. Holl. Maatsch. Wet. Haarlem*, xx. 2. 1782, p. 346; *Bl. Schn.* p. 500.

—— hexagonus, *Thunberg*, *Vet. Ac. Nya Handl.* xi. 1790, p. 107, tab. 3; *Bl. Schn.* p. 502.

—— stictonotus, *Schleg. Faun. Japon. Poiss.* p. 297, tab. 131. fig. 3; *Bleek. Verh. Ak. Wet.* i. *Japan*, p. 15.

Carapace six-ridged, there being a ridge along the middle of each side; no crest on the back or abdomen; a naked stripe in front of the vent. No supraorbital spines; a short flat spine in the middle of each dorsal and ventral ridge; sometimes some additional spines on the lateral and ventral ridges. The upper half of the body with brown spots.

Japan.

a–b, *c–e*. Adult (6 inches long) and half-grown. Japan.

2. **Aracana unistriata.**

Acerana (Capropygia) unistriata, (*Gray*) *Kaup*, *Wiegm. Arch.* 1855, p. 220.

Body six-ridged. Four large compressed spines; one on each lateral dorsal ridge and one near the end of each ventral ridge. No supraorbital spines. Interorbital space concave. A blackish longitudinal band from the eye along the side.

Habitat ——?

a–c. Types of the species: skins, 3–4½ inches long.

3. **Aracana aurita.**

Ostracion auritus, *Shaw*, *Nat. Misc.* tab. 338, or *Gen. Zool.* v. p. 429, pl. 173; *Lacép. Ann. Mus.* iv. p. 58; *Richards. Trans. Zool. Soc.* iii. p. 160, tab. 9.

Ostracion striatus, *Shaw, Zool.* v. p. 430.
—— (Aracana) auritus, *Gray, Ind. Zool.* c. fig.; *Bleek. Verh. Ak. Wet. Amsterd.* 1855, *Van Diemen's Land*, p. 26; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 143.
—— (Aracana) lineata, *Gray, Ann. Nat. Hist.* i. 1838, p. 110.
—— reevesii, *Gray, l. c.* p. 111.
—— fobinii, *Donov. Nat. Rep.* tab. 66.
—— spilogaster, *Richards. Proc. Zool. Soc.* 1840, p. 27, and *Trans. Zool. Soc.* iii. p. 163, t. 10. f. 1; *Hollard, l. c.* p. 145; *Bleek. l. c.* p. 27.

Back without, abdomen with a crest. Spines: one above the hind part of the orbit pointing backwards; two on each side of the back, rather close together; one in the middle of the side; two or three on each side of the abdomen. Anterior profile of the snout without hump. Head and body with longitudinal, more or less undulated brown stripes, much narrower than the interspaces; there are four of them on each cheek. In old preserved examples the ornamental colours disappear, the entire fish being of a more or less uniform coloration.

Tasmania; South Australia.

a. Type of the species: skin. From Cook's voyage.
b. Adult (6 inches long): skin. Presented by J. R. Reeves, Esq.—Type of *O. reevesii.*
c. Adult. Tasmania.
d–e. Half-grown: skins. Tasmania.
f–h. Young: skins. Tasmania.—Types of *O. lineatus.*
i. Adult. Australia. Presented by J. B. Jukes, Esq.—Type of *O. spilogaster.*
k. Adult: skin. Australia. Presented by G. F. Angas, Esq.
l. Half-grown. Australia. Presented by Sir John Richardson.
m. Several adult and half-grown examples: skins.
n. Young.

4. Aracana ornata.

Ostracion (Aracana) ornata, *Gray, Ann. Nat. Hist.* i. 1838, p. 110; *Richards. Trans. Zool. Soc.* iii. p. 165, tab. 10. fig. 2; *Hollard, Ann. Sc. Nat.* 1857, vii. p. 142.
—— (——) flavigaster, *Gray, l. c.*; *Richards. l. c.* p. 164, tab. 11. fig. 1.

Back without, abdomen with, a crest. Spines: one above the middle of the orbit, nearly erect, pointing upwards and outwards; two on each side of the back; one in the middle of the side; two on each side of the abdomen, the foremost being well developed, and situated immediately behind the root of the pectoral. Snout of adult examples with a more or less developed hump. Head and body with numerous alternate brown and yellowish longitudinal stripes, the brown ones being rather broader than the yellowish; there are about seven brown ones on each side of the head. The brown stripes of the body are sometimes broken up into small spots (*O. ornatus*).

Tasmania; Southern Australia.

a. Type of *O. ornatus*: skin, 5 inches long. Tasmania.
b. Type of *O. flavigaster*: skin, 5 inches long. Tasmania.
c–d. Half-grown: skins. Tasmania.
e. Young. Port Lincoln. From the Collection of the Zoological Society.
f–h. Half-grown and young: in bad state.

5. Aracana lenticularis.

Ostracion lenticularis, *Richards. Proc. Zool. Soc.* 1841, p. 21, and *Trans. Zool. Soc.* iii. p. 158.
Acerana (Anoplocapros) grayi, *Kaup, Wiegm. Arch.* 1855, p. 221.

Carapace much compressed, back and abdomen compressed into a crest; no spines, sometimes the centre of each scute slightly raised. Body uniformly coloured or with blackish spots on its upper half.

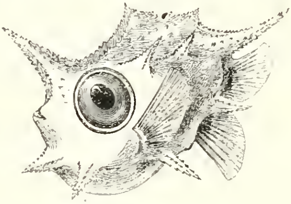
South Australia.

a–b. Twelve inches long. Sydney. From Mr. Krefft's Collection.
c. Adult: skin. South Australia.—Type of the species.
d. Adult: skin. Australia.—Type of *A. grayi*.
e–h. Half-grown and young: skins.

APPENDIX TO OSTRACION.

Ostracion boops.

Ostracion boops, *Richards. Voy. Ereb. & Terr. Fish.* p. 52, pl. 30. figs. 18–21.
Centaurus boops, *Kaup, Wiegm. Arch.* 1855, p. 221.



This fish was taken in the South Atlantic by Dr. Hooker, in a tow-net. No specimen was preserved. It is evidently a young Ostracion.

Fam. 2. GYMNODONTES.

Gymnodontes, *Cuv. Règne Animal.*

Body more or less shortened. The bones of the upper and lower jaw are confluent, forming a beak with a trenchant edge, without teeth, with or without median suture. A soft dorsal, caudal, and anal are developed, approximate. No spinous dorsal. Pectoral fins; no ventrals.

Marine fishes of the temperate and tropical regions. Some species confined to fresh water.

Synopsis of the Groups and Genera.

First Group. **Triodontina.**

Tail rather long, with a separate caudal fin; abdomen dilatable into a large compressed sac, supported by a long pelvic bone. Air-bladder present.

The upper jaw divided by a median suture, the lower simple.
1. *Triodon*, p. 270.

Second Group. **Tetrodontina.**

Tail and caudal fin distinct. Part of the œsophagus much extensible, and capable of being filled with air. No pelvic bone. Air-bladder present.

A. *Both jaws divided by a median suture.*

Dorsal and anal fins many-rayed .... 2. *Xenopterus*, p. 270.
Dorsal and anal fins very short .... 3. *Tetrodon*, p. 271.

B. *Jaws without median suture.*

Nasal tentacle simple, with a pair of lateral openings. Dermal ossifications with a stiff but moveable spine .... 4. *Diodon*, p. 306.
Nasal tentacle simple, with a pair of lateral openings. Most of the dermal ossifications three-rooted, with a stiff immoveable spine.
5. *Chilomycterus*, p. 309.
Nasal tentacle with two cylindrical and tapering branches; no nostril. Posterior dermal ossifications three-rooted, with a stiff immoveable spine .... 6. *Dicotylichthys*, p. 314.
Nasal tentacle as in *Dicotylichthys*. All dermal ossifications with stiff moveable spines .... 7. *Atopomycterus*, p. 315.
A nasal tentacle. Dermal ossifications very small, two-rooted, with a fine flexible spine........................ 8. *Trichodiodon*, p. 316.
No nasal tentacle. Body covered with long hair-like bristles.
9. *Trichocyclus*, p. 316.

Third Group. **Molina.**

Body compressed, very short, not extensible by air; tail extremely *short, truncate. Vertical fins confluent. No pelvic bone. Air-bladder absent.*

Jaws without median suture .... 10. *Orthagoriscus*, p. 317.

First Group. TRIODONTINA.

1. TRIODON.

Triodon, (*Reinwardt*) *Cuv. Règne Anim.*

The upper jaw divided by a median suture, the lower simple. Body covered with small osseous, scale-like, spiny subimbricate laminæ. Two distinct nasal openings on each side. Tail long, terminating in a distinct bilobed fin; Caudal and anal fins short. Abdomen dilatable into a very large, compressed, pendant sac, the lower part of which is merely a flap of skin, into which the air does not penetrate. The sac is kept expanded by the very long pelvic bone. Skeleton ossified, with the ribs well-developed.

Indian Ocean and archipelago.

1. Triodon bursarius.

Renard, Poiss. Moll. ii. pl. 30. fig. 142; *Ruysch, Amb.* p. 31, pl. 16. fig. 1.

Triodon bursarius, (*Reinw.*) *Cuv. Règne An.*; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 20, and *Atl. Ichth. Gymnod.* p. 84, pl. 10. fig. 1.

—— macropterus, *Less. Voy. Coqu. Zool.* pl. 4; *Dareste, Ann. Sc. Nat.* xii. p. 68, pl. 1. fig. 1 (osteol.).

B. 6. D. 10. A. 9. C. 18.

Eye large, about one-fourth of the length of the head. A large irregular black spot edged with yellow on the upper part of the ventral sac.

Indian Ocean and archipelago.

a–b. Adult (19–21 inches long): stuffed. Mauritius. Purchased of Mr. Cuming.

c–d. Adult: stuffed. India.

Second Group. TETRODONTINA.

Globe-fishes, well known from their being able to fill their body with air, and to float on the surface of the water belly upwards.

2. XENOPTERUS.

Xenopterus, *Bibron, Rev. Zool.* 1855, p. 281.

Chonerhinus, *Bleek. Atl. Ichth. Gymnod.* p. 77 (not before characterized).

Jaws divided by a median suture. Body with small dermal ossifications, each with two or three roots and a spine. Dorsal and anal fins many-rayed. Nostrils funnel-shaped, with fringed margin.

Indian archipelago.

1. Xenopterus naritus.

Tetraodon naritus, *Richards. Voy. Samar. Fish.* p. 18, pl. 8; *Cant. Mal. Fish.* p. 383, pl. 10; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 21, or *Nat. Tydschr. Ned. Ind.* iii. p. 439.

Tetrodon grandispina, *Van der Hoeven, Handb. Dierk.* 2nd edit. ii. p. 275.

Chonerhinus naritus, *Bleek. Atl. Ichth. Gymnod.* p. 77, pl. 7. fig. 2.

D. 32–38. A. 28–32. The abdominal spines ascend to above the level of the pectoral, in front and behind this fin. Eye not larger than the nostril (in adult examples).

Vert. 12/17. This species has very frequently osseous tumors on the first interhæmal and on the last hæmal and neural spines. These enlargements are constantly observed in certain Acanthopterygians.

Rivers of Sumatra and Borneo; Sea of Pinang.

a. Type of the species. Sarawak. Presented by Sir J. Richardson.
b. Eleven inches long. Borneo. From Dr. Bleeker's Collection.
c–d. Half-grown: skins. Pinang. From Dr. Cantor's Collection.
e. Adult: skeleton.

2. Xenopterus modestus.

Tetraodon modestus, *Bleek. Nat. Tyds. Ned. Ind.* i. p. 16, and iii. p. 440, or *Verh. Bat. Gen.* xxiv. *Blootk.* pp. 19, 21.

Chonerhinus modestus, *Bleek. Atl. Ichth. Gymnod.* p. 78, pl. 9. fig. 8.

D. 25–26. A. 23–25. The abdominal spines do not extend upwards beyond the root of the pectoral. Eye larger than nostril.

Rivers of Sumatra and Borneo.

a. Four inches long. Borneo. Purchased of Hr. Frank.
b. One of the typical specimens. Borneo. From Dr. Bleeker's Collection.

3. TETRODON*.

Tetraodon, sp., *Linné.*

Gastrophysus (Physogaster), Chelonodon, Cheilichthys *et* Arothron, *Müller, Abhandl. Berl. Ak.* 1839, p. 252, and *Wiegm. Arch.* 1843, p. 330.

Holacanthus, *Gronov. Syst.* ed. *Gray*, p. 23.

Prilonotus vel Anchisomus, *Kaup, in Voy. Herald, Fish.* 1854.

Tropidichthys, *Bleeker*, 1854.

Anosmius, *Peters, Wiegm. Arch.* 1855, p. 274.

Promécocéphale, Dilobomyctère, Tetrodon, Amblyrhynchote, Gencion, Catophorhynque, Batrachops, Monotrète, Rhynchote, *Bibron, Rev. et Mag. Zool.* 1855, p. 279 *et seqq.*

---

* 1. Tetraodon brunneus, *Brevoort, Exped. Japan, Fish*, p. 284.—Japan.—Founded on a rude drawing.
2. —— lineolatus, *Poey, Repert. Fis.-nat. Cuba*, 1868, p. 432.—Cuba.
3. —— grammatocephalus, *Schleg. Faun. Japon. Poiss.* p. 286, pl. 126. fig. 3.—Japan.
4. Crayracion cochinchinensis, *Steindachner, Verh. zool.-bot. Ges. Wien*, 1866, p. 480, taf. 5. fig. 1.—Cochinchina.
5. Tetraodon blochii, *Castelnau, Poiss. d'Afr. Austr.* p. 75.—Kalk Bay, South Africa.

Rhynchotus, Batrachops, Apsicephalus, Brachycephalus, Monotreta, *Hollard, Ann. Sc. Nat.* 1857, viii. p. 275 *et seqq.*

Tetraodon, Crayracion (*Klein*), Leiodon (*Swains.*), Canthogaster (*Swains.*), *Bleeker, Atl. Ichth. Gymnod.* p. 49

Osteology: see *Hollard, l. c.*; *Owen, Osteolog. Catal.* i. p. 81.

Jaws divided by a median suture. Body with or without small dermal ossifications. Dorsal and anal fins short, with the rays in small number.

Tropical and subtropical seas; some species in rivers.

Synopsis of the Subgenera and Species.

I. The dermal ossifications are in the form of spines and of scutes, the latter forming a continuous carapace round the trunk: *Hemiconiatus*, m., p. .

II. No scutes forming a carapace.

1. Nasal organs very conspicuous. Back broad, not compressed.
    - A. Nasal openings two on each side, opposite to each other, and situated in a single more or less prominent papilla: *Tetraodon*, Bleek.
        - *a.* A more or less distinct fold along the lower part of the tail: *Gastrophysus*, Müll., p. 273.
        - *b.* No fold along the lower part of the side of the tail or body. Body more or less spiny: *Cheilichthys*, Müll., p. 282.
        - *c.* No fold along the lower parts. Skin entirely smooth: *Liosaccus*, m., p. 287.
    - B. Nasal opening one on each side; it is in a simple tube, which is sometimes two-lipped at the extremity. Body spiny: *Crayracion*, sp., Bleek., p. 288.
    - C. A simple, non-perforate nasal cavity with a fringed edge. Body spiny: *Chelonodon*, Müll., p. 288.
    - D. A simple circular nasal cavity. Body smooth: *Monotretus*, Bibr., p. 290.
    - E. On each side two solid nasal tentacles without opening: *Arothron*, Müll., p. 290.
2. Nasal organs quite inconspicuous. Back compressed into a keel: *Anosmius*, Ptrs., p. 300.

I. *The dermal ossifications are in the form of spines and of scutes, the latter forming a continuous carapace round the trunk*: Hemiconiatus, *m.*

1. Tetrodon guttifer.

Bennett, Proc. Comm. Zool. Soc. 1830, p. 148.

Head entirely naked; the greater part of the trunk, down to the sides of the belly, covered with granulated scutes, irregular in shape and size, forming a carapace as in *Ostracion*. The scutes pass posteriorly into lanceolate ossifications, which are entirely hidden in the skin. Throat and anterior part of abdomen with numerous small two-rooted spines. Snout obtuse, the small eye being midway between the end of the snout and the gill-opening. Interorbital space very broad. Nostrils? The length of the head is rather less than its distance from the dorsal, which is of moderate size, nine-rayed (?). Caudal fin slightly emarginate. Brownish grey above, with small scattered whitish spots in small number.

West Africa.

a. Stuffed, 20 inches long. Gambia. Purchased of Mr. Whitely.

The typical specimen of Bennett's *T. guttifer* appears to be lost; yet I do not hesitate to identify our specimen with Bennett's species, as the diagnosis given by him agrees well enough with it. He did not perceive the osseous scutes which in fresh specimens may be hidden below the skin, or be entirely absent in younger examples.

II. *No scutes forming a carapace.*

1. *Nasal organs very conspicuous. Back broad, not compressed.*

A. *Nasal openings two on each side, opposite to each other, and situated in a single more or less prominent papilla.*

a. *A more or less distinct fold of the skin along the lower part of the tail:* Gastrophysus (Müll.).

2. Tetrodon lagocephalus.

Seba, iii. pl. 23. fig. 6 (young).
Tetrodon lagocephalus, *L. Amœn. Acad.* i. p. 310, tab. 13. fig. 4 (bad), and *Syst. Nat.* i. p. 410 (not synon.); *Penn. Brit. Zool.* ed. 1812, iii. p. 174, pl. 23.
—— lævigatus, *Penn. Brit. Zool.* iii. p. 132, pl. 20.
—— stellatus, *Donov. Brit. Fish.* iii. pl. 66; *Turton, Brit. Faun.* p. 116; *Flem. Brit. An.* p. 174; *Jenyns, Man.* p. 489.
Lagocephalus pennantii, (*Swains.*) *Bonap. Faun. Ital.*
Tetrodon pennantii, *Yarr. Brit. Fish.* 2nd edit. ii. p. 457; *Couch, Fish. Brit. Isl.* iv. p. 373, pl. 244.

Body entirely naked above and on the sides; *abdomen covered with fixed four-rooted spines of moderate size.* The length of the head less than its distance from the dorsal. Caudal fin emarginate. Uniform greenish above, sides silvery, sometimes with round blackish spots; abdomen white. Young with eight or nine cross bands on the back, and generally with black spots on the belly.

East-African coasts: Irish and English coasts.

a. Adult: stuffed. Algoa Bay. Presented by the Zoological Society.
b. Adult ($19\frac{1}{2}$ inches): stuffed. South Africa. Presented by Sir A. Smith.
c. Half-grown: stuffed. Mauritius. From the Collection of the Zoological Society.
d. Adult: stuffed. Charmouth, Dorsetshire. Presented by H. E., Norris, Esq. through the kindness of Ld Enniskille
e. Adult: skin.
f. Young: skin.
g. Very young (2 inches). From the Haslar Collection.—This ex-

ample shows the black dorsal cross bands, agreeing perfectly with the figure given in Seba's 'Thesaurus.'

h, i. Several very young examples, 1–2 inches long. Open ocean. —Coloration as in spec. *g.*

k. Several very young examples, obtained in latitude 20° N., longitude 22° 53′ W.

3. **Tetrodon lævigatus.**

Orbis lagocephalus, *Grew, Mus. Reg. Soc.* 1681, p. 108, tab. 7 (lower figure); *Willughby*, p. 144, tab. J. 2.

Ostracion no. 13, *Artedi, Genera*, p. 58.

Tetrodon lævigatus, *L. Syst. Nat.* i. p. 411; *Lacép.* i. pp. 476, 497, 500; *Bl. Schn.* p. 506; *Dekay, New York Faun. Fish.* p. 329, pl. 56. fig. 182; *Storer, Mem. Am. Soc.* viii. p. 418 (pl. 34. fig. 1); *Poey, Repert. Fis.-nat. Cub.* 1868, p. 431.

—— lagocephalus, (not *L.*) *Bl. Ausl. Fisch.* i. p. 126, taf. 140; *Lacép.* i. pp. 475, 495; *Bl. Schn.* p. 503.

Tambosil, *Parra*, p. 37, lam. 19.

? Tetrodon curvus, *Mitch. Lit. & Phil. Trans. New York*, i. p. 472 (young).

Tetrodon mathematicus, *Mitch. l. c.* p. 474, pl. 6. fig. 6; *Storer, Bost. Journ. Nat. Hist.* iv. p. 183.

—— pachycephalus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* iv. 1840, p. 73, pl. 10. fig. 2.

Holocanthus melanothos, *Gronov. Syst.* ed. *Gray*. p. 24.

Gastrophysus lævigatus, *Bleek. Natuurk. Verh. Holl. Maatsch. Wet. Haarlem*, 1863, xviii. p. 22, pl. 2.

Body entirely naked above and on the sides; abdomen with small three-rooted spines. The length of the head equal to the distance of the gill-opening from the dorsal fin. Caudal fin forked in old examples, subtruncate in half-grown. Uniform greenish above, sides silvery, abdomen white.

Atlantic coasts of tropical America; Japan.

a. Adult. Gulf of Mexico. From the Haslar Collection.
b. Half-grown. Bahia. From Dr. Wucherer's Collection.
c. Adult.
d–e. Adult: stuffed. Old Collection.
f. Adult: skin. From Gronow's Collection.

Tetraodon inermis, Schleg. Faun. Japon. Poiss. p. 278, pl. 122. fig. 2, I regard as a variety of *T. lævigatus*; it appears to differ only in the size of the abdominal spines, which are reduced to granules.

4. **Tetrodon lunaris.**

Tetrodon lunaris, *Bl. Schn.* p. 505; *Schleg. Faun. Japon. Poiss.* p. 277, pl. 122. fig. 1; *Rüpp. N. W. Fisch.* p. 59; *Cant. Mal. Fish.* p. 378; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 12, and *Atl. Ichth. Gymnod.* p. 63, pl. 1. fig. 2; *Day, Fish. Malabar*, p. 255.

Russell, i. p. 20. no. 29.

Tetrodon tepa, *Ham. Buch.* pp. 10, 362.

—— leiopleura, *Gray, Ind. Zool.*

Physogaster lunaris, *Müll. Abhandl. Ak. Wiss. Berl.* 1839, p. 252.

Gastrophysus lunaris, *Müll. Wiegm. Arch.* ix. p. 330.
Promecocephalus lunaris, *Bibr. Rev. Zool.* 1855, p. 279.
Tetrodon spadiceus, *Richards. Voy. Sulph. Ichth.* p. 123, pl. 58. figs. 4 & 5; *Bleek. Atl. Ichth. Gymnod.* p. 64, pl. 3. fig. 1.

The back is either entirely covered with small spines (*lunaris*), or anteriorly only (*spadiceus*); abdomen covered with similar spines; Snout, sides, and tail entirely naked. The length of the head is equal to or a little less than its distance from the dorsal fin. Caudal fin emarginate. Uniform brownish above, sides silvery, abdomen white. Rarely a large brown band across the back.

Indian Ocean and archipelago; Pacific; coast of Brazil.

Var. α. *lunaris*. Back entirely covered with spines; the length of the head equals its distance from the dorsal fin.

a. Young: stuffed. Cape Seas. Presented by Sir A. Smith.
b. Young. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Adult: skin. Pinang. From Dr. Cantor's Collection.
d. Half-grown. Sarawak. Presented by the Marquis J. Doria.
e. Adult (8 inches). East-Indian archipelago. From Dr. Bleeker's Collection.
f. Young. China. Presented by J. R. Reeves, Esq.
g. Half-grown.

Var. β. Interorbital space and neck covered with spines; the length of the head equals its distance from the dorsal fin. A broad dark band across the middle of the back.

h. Eight and a half inches long. Brazil. Presented by J. P. G. Smith, Esq.

Var. γ. *spadiceus* (Rich.). Interorbital space and fore part of the back covered with spines; the length of the head equals its distance from the dorsal fin. Back without cross band.

i–k. Young. Vizagapatam. Presented by Captain Mitchell.
l. Young. Coast of Malabar. Presented by Surgeon F. Day.
m–o. Half-grown. Borneo. Purchased of Hr. Frank.
p. Half-grown. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
q. Adult. Philippine Islands. Purchased of Mr. Cuming.
r. Adult. China. Presented by J. R. Reeves, Esq.—Type of *T. spadiceus*.
s. Half-grown.

Var. δ. *spadiceus* (Blkr.). Like var. γ, but the length of the head is less than its distance from the dorsal fin.

t. Ten inches long. East-Indian archipelago. From Dr. Bleeker's Collection.
u. Eleven inches long. Japan. Purchased of Mr. Jamrach.

5. Tetrodon sceleratus.

Tetrodon sceleratus, (*Forst.*) *Gm. L.* i. p. 1444; *Bl. Schn.* p. 506 *Lacép.* i. pp. 476, 508.
—— argenteus, *Lacép. Ann. Mus. d'Hist. Nat.* iv. 1804, p. 211, p. 58. fig. 2; *Schleg. Faun. Japon. Poiss.* p. 275, pl. 121. fig. 2; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 737, and *Atl. Ichth. Gymnod.* p. 64, pl. 5. fig. 1.
—— argyropleura, *Bennett, Proc. Comm. Zool. Soc.* ii. 1832, p. 184.
—— argentatus, *Blyth*, in *Kelaart's Prodr. Faun. Zeyl.* i. *Append.* p. 49.
Promecocephalus argentatus, *Bibron, Rev. Zool.* 1855, p. 279.
Tetraodon bicolor, *Brevoort, Not. Japan. Fish.* p. 283.

Head and back finely chagrined above; abdomen with very small three-rooted spines. Side naked. Body elongate, tail depressed. The length of the head is less than its distance from the dorsal fin. Caudal fin emarginate. Sides with a well-defined silvery band; the parts above the band brownish, with small darker or black spots. The brown colour encircles the eye completely; a triangular silvery spot in front of the eye. A brownish band round the chin runs along and below the silvery band. Gill-opening deep black.

Vert. 7/10.

Indian Ocean and archipelago; Polynesia and Australia.

a-*b*. Adult (27 inches) and young: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c. Young. Zanzibar. From Lieut.-Col. Playfair's Collection.
d. Adult. Ceylon. From the Collection of the Zoological Society. —Type of *T. argyropleura*.
e. Adult: stuffed. Madras.
f. Young. Amboyna. Purchased of Hr. Frank.
g. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
h. Young. Philippine Islands. Purchased of Mr. Cuming.
i-*l*. Young. Formosa. From Consul Swinhoe's Collection.
m. Young. South Australia. From Mr. Bynoe's Collection.
n. Adult: stuffed. Australia? Voyage of H.M.S. 'Herald.'
o. Adult: stuffed. Presented by the Linnean Society.
p-*q*. Skulls.
r. Adult: skeleton.

6. Tetrodon honckenii.

Tetraodon honckenii, *Bl. Ausl. Fisch.* i. p. 133, tab. 143; *Lacép. Poiss.* i. pp. 475, 492; *Bl. Schn.* p. 504; *Bleek. Atl. Ichth. Gymnod.* p. 60, pl. 2. fig. 2; *Castelnau, Poiss. Afr. Austr.* p. 74.
—— atratus, *Richards. Voy. Samarang, Fish.* p. 15, pl. 7.
Holocanthus lagocephalus, *Gronov. Syst.* ed. *Gray*, p. 25.
Gastrophysus honckenii, *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 258.

Back covered with very small spines from the nostrils nearly to the dorsal fin; abdomen entirely covered with numerous similar spines; a cross band of spines across the side behind the pectoral fin; the remainder of the side naked. The length of the head is a little less than its distance from the dorsal fin. Caudal fin truncate. *The upper teeth scarcely half the size of the lower.* The width of the osseous interorbital space is much less than the length of the snout, not much more than the diameter of the eye. Upper half brown or black, with irregular larger and smaller whitish spots; lower half white. Cheeks without cross bands. Caudal fin nearly entirely black.

Vert. 8/12.

From the Cape of Good Hope to China.

a–c. Adult and half-grown: stuffed. Cape. Presented by Sir A. Smith.
d. Adult: skin. Cape. From Gronow's Collection.
e, f–g. Half-grown and young. Cape.
h. Adult. Borneo. Presented by Sir J. Richardson.
i. Adult. Celebes. From Dr. Bleeker's Collection.
k. Adult. China. From the Haslar Collection.—Type of *T. atratus.*
l–m, n–o. Adult (9 inches).
p–r. Adult: skeleton.

7. Tetrodon hypselogenion.

Tetrodon honckenii, *Rüpp. Atl. Fisch.* p. 65, taf. 17. fig. 2 (not *Bl.*).
—— hypselogeneion, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 300, or *Verh. Bat. Gen.* xxiv. *Blootk.* p. 24, or *Atl. Ichth. Gymnod.* p. 61, pl. 9. fig. 5.

Back from the interorbital space to near the dorsal fin, and nearly the entire abdomen, with spines, which are rather distantly placed and, comparatively, not very small; a cross band unites the dorsal and abdominal spines behind the pectoral fin, the remainder of the side being naked. The length of the head equals its distance from the dorsal fin. Caudal fin truncate. The upper teeth more than half as large as the lower. The osseous interorbital space very narrow, narrower than the eye. Above brown or black, with numerous small round whitish spots. Sides with a broad silvery band, which, in Australian examples, is separated from the colour of the back by a deep black longitudinal stripe, and sometimes has another similar but shorter stripe along its middle. Lower parts white. *Cheek with from three to five subvertical brown bars.*

Vert. 7/13.

From the east coast of Africa to Australia.

a, b–c. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
d. Half-grown: stuffed. Zanzibar. Presented by Lieut.-Col. Playfair.
e. Adult. Seychelles. From E. P. Wright's Collection.
f. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
g. Half-grown. Feejee Islands. Voyage of the 'Herald.'
h. Adult (5 inches). Australia. Purchased of Mr. Stevens.

i, *k–m*. Half-grown and young. Sydney. From Mr. Krefft's Collection.

n–o. Half-grown: stuffed.

p. Adult: skeleton.

8. **Tetrodon oblongus.**

Tetraodon oblongus, *Bl. Ausl. Fisch.* ii. p. 6, taf. 146. fig. 1; *Lacép.* i. pp. 476, 502; *Bl. Schn.* p. 504; *Cant. Mal. Fish.* p. 380; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 12, and *Atl. Ichth. Gymnod.* p. 62, pl. 4. fig. 4.

Physogaster oblongus, *Müller, Abhandl. Ac. Wiss. Berl.* 1839, p. 252.

Tetraodon alboplumbeus, *Richards. Voy. Sulph. Ichthyol.* p. 121, pl. 58. figs. 6 & 7; and *Ichth. Chin.* p. 199; *Bleek. l. c.* p. 62, pl. 1. fig. 1.

—— pœcilonotus, *Schleg. Faun. Japon. Poiss.* p. 279, pl. 124. fig. 2.

—— patoca, *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 11 (not *H. B.*).

Gastrophysus alboplumbeus, *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 104.

Tetraodon niveatus, *Brevoort, Notes on Japan. Fish.* p. 284.

—— hartlaubii, *Bianconi, Mem. Accad. Bologn.* vi. p. 146, pl. 2. fig. 1.

Gastrophysus microphthalmus, *Blyth, Journ. As. Soc. Beng.* xxix. 1861, p. 174.

Back and belly covered with small two-rooted spines, the snout and tail being naked; the sides are generally crossed by two broad stripes of spines in front and behind the pectoral fin. The length of the head is nearly equal to its distance from the dorsal fin. Caudal fin truncate. The upper teeth not much smaller than the lower. The osseous interorbital space is broad in adult examples (from about 6 inches in length), its width being equal to the length of the snout. Upper part of the head and middle of the back brown, with round white spots; on the sides the brown colour descends in irregular transverse bands (*oblongus*). Frequently the distribution of the colours on the sides is the same as on the middle of the back; that is, all the upper half of the fish is brown, with round white spots (*alboplumbeus*). Frequently a large round black spot above the end of the pectoral fin.

Indian Ocean; seas of China and Japan; South Sea.

Var. *α. oblongus.*

a. Adult (13 inches): stuffed. Bombay. Purchased of Mr. Bartlett.

b. Adult: stuffed. Madras?

c. Young: skin. Pinang. From Dr. Cantor's Collection.

d, *e*. Adult. East-Indian archipelago.

f. Young. Amoy. From Consul Swinhoe's Collection.

g. Adult. China. Purchased of Mr. Warwick.

h–i. Adult: stuffed. India.

k–o. Adult (15 inches long): stuffed.

Var. *β. alboplumbeus, without black humeral spot.*

p. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.

q. Half-grown. Sumatra.

Var. γ. *alboplumbeus, with a black humeral spot.*

r. Adult ($11\frac{1}{2}$ inches). China. Presented by Mr. Beard.
s. Young. China. Presented by General Hardwicke.—Type of *T. alboplumbeus.*
t–v. Adult and half-grown. Japan.
w. Half-grown. South Seas. Presented by S. Stuchbury, Esq.

9. Tetrodon ocellatus.

(Diodon) Tetrodon ocellatus, *Osbeck, It.* p. 226, or Engl. edit. i. p. 364, ii. p. 331; *L. Syst. Nat.* i. p. 411; *Bl.* taf. 145; *Lacép.* i. pp. 475, 497; *Bl. Schn.* p. 504; *Richards. Voy. Sulph. Fish.* p. 120, pl. 58. figs. 1 & 2.
Tetrodon fasciatus, *M'Clell. Calc. Journ. Nat. Hist.* iv. p. 412, pl. 21. fig. 2.
Tetrodon, sp., *Benn. in Beechey's Voy. Zool.* p. 50.
Tetrodon bimaculatus, *Richards. l. c.* p. 119, pl. 57. figs. 7–9.

Back covered with minute spines from the interorbital space nearly to the dorsal fin; abdomen entirely covered with similar spines; sides entirely naked. The length of the head is rather less than its distance from the dorsal fin. Caudal fin truncate. Upper teeth without ridge in front. A black white-edged band crosses the back, terminating laterally in a more or less distinct black spot. Base of the dorsal fin on a round black white-edged spot. Head and back sometimes with brown cross bands, curved backwards on the sides, among which the black cross bar is lost (*bimaculatus*).

China.

Var. α. *bimaculata.*

a. Adult (13 inches), stuffed. China. Presented by J. R. Reeves, Esq.
b. Type of *T. bimaculatus.* China. Presented by J. R. Reeves, Esq.
c. Young: stuffed. China. Purchased by Mr. Argent.
d, e. Half-grown and young.

Var. β. *ocellata.*

f, g, h–k. Three inches long. China.
l–m. Three inches long: stuffed.

Var. γ. Back brown, with annular and vermiculated white markings.

n. Four inches long. China.

10. Tetrodon rubripes.

Tetraodon rubripes, *Schleg. Faun. Japon. Poiss.* p. 283, pl. 123. fig. 1.
—— xanthopterus, *Schleg. l. c.* p. 284, pl. 125. fig. 1.
Gastrophysus rubripes, *Bleek. Act. Soc. Sc. Indo-Neerl.* viii. *Japan,* vi. p. 68.
—— xanthopterus, *Bleek. l. c.* p. 69.

Back covered with very small spines from the interorbital space nearly to the dorsal fin; abdomen entirely covered with similar spines; the dorsal and abdominal patches of spines are nowhere confluent. The length of the head is rather less than its distance from the dorsal fin. Caudal fin subtruncate. The osseous interorbital space very broad, much broader than the orbit. Each upper tooth with a groove and ridge near the median line. A more or less distinct light ring round the root of the dorsal fin, less conspicuous in adult than young specimens. Upper parts brown; in young examples light bands cross the back, and run backwards along each side of the back. The lateral bands are frequently persistent (*xanthopterus*); but sometimes they disappear, the upper part of the side being spotted with black, one large spot above the end of the pectoral (which is also sometimes visible in the variety *xanthopterus*) being the most conspicuous (*rubripes*).

Japan and China.

Var. *α. rubripes.*

a–b. Adult (19 inches): stuffed. Japan. Two of the types of *T. rubripes.*

Var. *β. xanthopterus.*

c. Adult (15 inches): stuffed. Japan. One of the types of *T. xanthopterus.*

d. Adult. Japan. Purchased of Mr. Jamrach.

e, f. Half-grown and young. China. From the Collection of the East-India Company.

g. Young. China. From the Collection of the Zoological Society.

11. Tetrodon hamiltonii.

Tetrodon hamiltoni, *Richards. Ichth. Ereb. & Terr.* p. 63, pl. 39. figs. 10 & 11.

The back and abdomen are covered with minute spines; however, frequently nothing is visible of the spines, except the pores in which they are lodged, and then the entire fish is smooth to the touch; and there are specimens which are evidently entirely spineless. Snout short, only one-half longer than the eye, and equal to the width of the osseous interorbital space. The length of the head is less than its distance from the dorsal fin. Caudal fin rounded. Lower lateral fold distinct. Upper parts brown, with numerous close round black spots; cheeks with some brown vertical bands or spots; some large dark blotches on the sides; sometimes an indistinct dark band across the back. Lower parts white.

Port Jackson.

a–b, c–e. Adult and half-grown. Port Jackson. From the Haslar Collection.—Types of the species.

f, g, h–k. Adult ($5\frac{1}{2}$ inches), half-grown, and young. Port Jackson.

12. Tetrodon vermicularis.

Krusenstern, Reise, Atlas, pl. 51. fig. 1.

Tetraodon vermicularis, *Schleg. Faun. Japon. Poiss.* p. 278, pl. 124. fig. 1.

Gastrophysus vermicularis, *Bleek. Verh. Bat. Gen.* xxv. *Japan*, p. 125.

Body entirely naked. Light-coloured, with short irregular, vermiculated blackish markings; or dark-coloured, with numerous rounded irregular lighter spots. A large blackish spot behind the pectoral fin, and on the base of the dorsal fin.

Japan.

13. Tetrodon stictonotus.

Tetraodon stictonotus, *Schleg. Faun. Japon. Poiss.* p. 280, pl. 126. fig. 1.

Gastrophysus stictonotus, *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 30.

Back and belly covered with small two-rooted spines, the snout and tail being naked. The dorsal and abdominal spines are only slightly confluent behind the dorsal fin, but not in front of it. The length of the head is less than its distance from the dorsal fin. Caudal fin subtruncate. The osseous interorbital space is slightly convex and very broad, its width being more than the length of the snout. Back finely mottled and spotted with brown and yellowish, sometimes the one colour being predominant, sometimes the other. Lower parts whitish.

Japan.

a. One of the typical specimens, stuffed, 16 inches long. From the Leyden Museum.

14. Tetrodon pardalis.

Tetraodon pardalis, *Schleg. Faun. Japon. Poiss.* p. 282, pl. 123. fig. 2.

Skin without spines, but with small soft tubercles. The fold on the lower part of the side of the tail is indistinct, not raised, but a furrow. Interorbital space flat, its width being less than the length of the snout. Fins rounded. Brownish above and on the sides, with irregular rounded black spots; abdomen of a dull orange colour.

Japan.

a–b. Two of the typical specimens, stuffed, 13 inches long. From the Leyden Museum.

15. Tetrodon politus.

Tetraodon politus, *Girard, U. S. & Pac. R. R. Exped. Fish.* p. 340; *Günth. Trans. Zool. Soc.* vi. p. 489 *.

Skin entirely smooth, with minute pouches, in which rudimentary spines are lodged without longitudinal wrinkles; an obscure fold along the lower part of the side of the tail. Snout produced, the eye being somewhat nearer to the gill-opening than to the end of the snout. The width of the interorbital space is equal to the length of the postorbital part of the head in an example thirteen inches long, but considerably less in another of eleven inches; it is slightly concave. Eight dorsal rays. Upper parts and sides blackish brown, with numerous black dots; belly whitish. Fins immaculate.

---

* The nasal papilla is not imperforated, but has two lateral openings.

California; Pacific Coast of Central America.

a. Fine specimen. San Jose. From Mr. Salvin's Collection.
b. Fine specimen. California. Presented by Dr. O. W. Ayres.

b. *No fold along the lower part of the side of the tail or body. Body more or less spiny*: Cheilichthys (*Müll.*).

16. Tetrodon testudineus.

? Orbis oblongus testudinis capite, *Clusii Exot.* vi. c. 26, p. 141.
Globe-Fish, *Catesby*, pl. 28 (bad).
Ostracion, sp. no. 21, *Artedi, Gen.* p. 60.
Tetrodon testudineus, *L. Amœn. Acad.* **i.** p. 309, tab. 14. fig. 3, and *Syst. Nat.* i. p. 410.
—— geometricus, *Bl. Schn.* p. 508.
3 stellatus gefärbt ? Tetrodon punctatus, *Bl. Schn.* p. 506; *Müll. & Trosch. in Schomburgk, Brit. Guiana*, iii. p. 641.
Tetraodon ammocryptus, *Gosse, Nat. Soj. Jamaica*, p. 287.
—— bajacu, *Casteln. Anim. Am. Sud, Poiss.* p. 98, pl. 47. fig. 3 (not good).
Anchisomus reticularis, (*Kaup*) *Richards. Voy. Herald, Fish.* p. 161, pl. 31 (not *Bl. Schn.*).
Holocanthus leionothos, *Gronov. Syst.* ed. *Gray*, p. 24.
Tetrodon punctatus, *Poey, Repert. Fis.-nat. Cub.* 1868, p. 432.

Minute spines cover the back from the interorbital space to near the dorsal fin, and the abdomen from the throat to the vent, the dorsal and abdominal spiny patches being connected by a transverse stripe of spines behind the pectoral fin, the snout, sides, and tail being naked. *Snout rather produced, the eye being nearer to the root of the pectoral fin than to the end of the snout.* Distance of the nostril from the eye not much less than the diameter of the latter. Interorbital space generally concave (flat in examples from Bahia); the diameter of the eye is two-thirds of the width between the bony orbital edges. Length of the caudal equal to its distance from the dorsal fin. Sides sometimes with small tentacles. Brownish black above, with whitish lines, the anterior of which are transverse (on the head and nape); one or two concentric circles in front of the dorsal fin. Sides yellowish, with small round brown spots. Abdomen and fins immaculate. The lines on the back are more regular in young than in old examples, which sometimes have the back and sides irregularly marbled and spotted with brown or black.

Vert. 8/10.

Tropical parts of the Atlantic.

a–b. Adult (8 inches) and half-grown. Jamaica. Purchased of Mr. Higgins.
c. Young. Jamaica. From Mr. Gosse's Collection.—Type of *T. ammocryptus*.
d. Half-grown: stuffed. Jamaica. From Mr. Gosse's Collection.
e–i. Adult, half-grown, and young: skins. Jamaica.

k. Young. Jamaica. Purchased of Mr. Parnell.
l. Adult. Dominica. Purchased of Mr. Cutter.
m. Adult (10 inches). St. Croix. Purchased of Mr. Stevens.
n. Adult. Puerto Cabello. Purchased of Hr. Brandt.
o. Half-grown. British Guiana. Purchased of Mr. Leadbeater.
p. Half-grown. Brazils. Presented by Lord Stuart.
q, *r–s*, *t–u*. Adult and half-grown. Bahia.
v, *w–x*, *y–α*. Adult, half-grown, and young. From the Zoological Society's Collection.
β. Adult: stuffed.
γ, *δ*. Half-grown and young. South America.
ε, *ζ*. Adult: skeletons.

17. Tetrodon heraldi.

Anchisomus geometricus, (*Kaup*) *Richards. Voy. Herald, Zool.* p. 156, pl. 30 (not *Bl. Schn.*).
Tetrodon geometricus, *Günth. Trans. Zool. Soc.* vi. 1868, p. 489.

Scarcely distinct from *T. testudineus*.

Minute spines cover the back from the interorbital space to near the dorsal fin, and the abdomen from the throat to the vent, the dorsal and abdominal spiny patches being connected by a transverse stripe of spines behind the pectoral fin, the snout, sides, and tail being naked. *Snout rather obtuse, the eye being nearer to the end of the snout than to the gill-opening* (*in the adult*). Distance of the nostril from the eye not much less than the diameter of the latter. Interorbital space flat and broad. The diameter of the eye is two-thirds of the width between the bony orbital edges. Length of the caudal fin equal to its distance from the dorsal fin. Brownish above, dotted with black and with whitish lines, the anterior of which are transverse (on the head and nape); one or two white concentric circles in front of the dorsal; the inner circle connected with the last transverse line by a median line. Abdomen and fins immaculate; caudal fin blackish in its outer half. The young example wants the black dots on the back.

Vertebræ 8/10.

Eastern Pacific.

a. Adult. Galapagos Islands. Presented by Sir J. Richardson.—Type of the species.
b. Young. Panama. From Mr. Salvin's Collection.

Tetrodon annulatus, Jenyns, Zool. Beagle, p. 153, from the Galapagos Islands, may prove to be identical with this species. Jenyns describes the interorbital space as "a little hollowed out;" but I find it quite flat in the typical example of *T. heraldi*.

18. Tetrodon formosus.

Minute spines cover the back from the interorbital space to near the dorsal fin, and the abdomen from the throat to the vent, the dorsal and abdominal spiny patches being connected by a transverse stripe of spines behind the pectoral fin, the snout, sides, and tail being naked. Snout rather obtuse, the eye being nearer to the end of the snout than to the gill-opening. Distance of the nostril from the eye equal to the diameter of the latter. Interorbital space slightly convex. The diameter of the eye is one-third of the width between the bony orbital edges. Length of the caudal fin equal to its distance from the anterior margin of the dorsal fin. Upper parts brownish, the upper part of the head and nape with about six pairs of curved black cross bands, their convexity being directed forwards. Back in front of the dorsal fin with two or three incomplete, concentric, ellipsoid black rings; the remainder of the upper part of the sides with irregular black spots. Sides, abdomen, and caudal fin whitish, washed with brownish. Dorsal fin immaculate.

South America.

a. Eight inches long. Purchased of Mr. Cuming.

19. **Tetrodon spengleri.**

Seba, iii. tab. 23. figs. 7–9.

Tetrodon spengleri, *Bloch, Ausl. Fische*, i. p. 135, tab. 144; *Bl. Schn.* p. 504; *Lacép.* i. pp. 476, 501.

—— plumieri, *Lacép.* i. pp. 476, 504, pl. 20. fig. 3 (bad; the black dashes were probably originally intended for the tentacles).

—— marmoratus, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* iv. 1840, p. 72, pl. 10. fig. 1; *Lowe, Trans. Zool. Soc.* ii. p. 193; *Valenc. in Webb & Berthol. Iles Canar. Poiss.* pl. 20. fig. 2.

Minute spines on the back from the occiput to halfway to the dorsal fin, and much more numerous on the abdomen; the sides are either entirely naked, or there are only a few minute spines behind the pectoral fin. Head and tail naked. Snout produced, the eye being nearer to the root of the pectoral fin than to the end of the snout. Distance of the nostril from the eye equal to the diameter of the latter. Interorbital space slightly concave, very narrow, the bony portion about half as wide as the eye. Length of the caudal fin equal to its distance from the dorsal fin. Sides with series of small tentacles. Brownish black above, white below; *a series of about twelve round brownish-black spots along the lower part of the side*, the spots being about the size of the eye.

Vert. 7/10. Coracoid dilated into a very broad lamina.

From Madeira and the west coast of Africa to the West Indies.

a–b. Adult (7 inches): stuffed. Madeira.

c. Adult. Madeira. Presented by the Rev. R. T. Lowe.—Type of *T. marmoratus*.

d, e. Adult. Madeira.

f. Adult. Lanzarote. Presented by the Rev. R. T. Lowe.

g. Young. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

h. Adult. West Africa. Purchased of Mr. Dalton.

i. Young. Santa Cruz. Presented by Prof. A. Newton.

k. Adult. Cuba. From the Collection of the Zoological Society.

l, m, n–o. Adult and young.
p. Adult: skeleton. Madeira. Presented by J. Y. Johnson, Esq.
q. Young: skeleton.

20. Tetrodon turgidus.

Toad-fish, *Schoepff, Beobacht. Ges. ntrf. Freund. Berl.* viii. p. 189.
Tetrodon turgidus, *Mitch. Lit. & Phil. Trans. New York,* i. p. 473, pl. 6. fig. 5; *Dekay, New York Faun. Fish.* p. 327, pl. 55. fig. 178; *Ayres, Journ. Bost. Soc. Nat. Hist.* iv. p. 285; *Storer, Mem. Am. Soc.* viii. p. 416, pl. 33. fig. 5.

Body, from the lips, covered with very small spines; caudal peduncle smooth. Snout rather produced, the eye being somewhat nearer to the root of the pectoral fin than to the end of the snout. The osseous portion of the interorbital space is very narrow, not wider than the diameter of the eye. Length of the caudal fin equal to its distance from the dorsal fin. Sides without tentacles. Upper parts brownish, clouded with darker or with numerous black dots. One or two series of rounded brownish-black spots, or vertical bars, along each side of the body. Lower parts uniform white.

Atlantic coasts of the United States.

a. Adult (8 inches). New York. Purchased of Hr. Brandt.
b. Half-grown. Texas. Purchased of Hr. Brandt.
c. Young. Lake Champlain. Purchased of Hr. Frank.
d–f. Adult and young. Lake Pontchartrain. From M. Sallé's Collection.

21. Tetrodon richei.

Tetraodon richei, *Fréminv. Nouv. Bull. Philom.* ii. p. 250, pl. 4. fig. 2; *Bleek. Atl. Ichth. Gymnod.* p. 61, pl. 9. fig. 3.
Gastrophysus richei, *Bleek. Verh. Ak. Wet. Amsterd.* ii. p. 24, fig. 3.
Amblyrhynchotus richei, *Bibr. Rev. Zool.* 1855, p. 280.

Body, from the lips, densely covered with minute spines. Caudal peduncle smooth. Snout rather obtuse, the eye being somewhat nearer to the end of the snout than to the gill-opening. Interorbital space broad. Orbit with a free fold in its entire circumference. Light brownish above, with irregular blackish spots and blotches. Lower parts uniform white.

South Australia; New Zealand.

a. Adult: stuffed (11 inches). South Australia.
b. Half-grown: in bad state. Hobart Town. From Dr. Bleeker's Collection.
c. Half-grown. New Zealand. Presented by W. Colenso, Esq.

22. Tetrodon multistriatus.

Anchisomus multistriatus, *Richards. Voy. Herald, Fish.* p. 160, pl. 29.

Spines rather large, scattered, two-rooted. A single spine stands on the median line immediately before the nostrils; six in two rows occupy the top of the head; on the occiput there are three in one transverse row. Snout and tail naked. The spines are rather widely apart on the back, but are more numerous and have longer points on the abdomen. Length of the snout more than the width of the interorbital space. The markings are a series of pale or whitish narrow loops extending obliquely forwards on the sides and cheeks, the areas being dark. On the posterior part of the sides and on the tail the loops are crenulated or beaded and interrupted, with the interstices flecked by short bars. On the middle of the back there is a series of concentric narrow and acute longitudinal ellipses. The lines on the face are also longitudinal; but on the sides of the tail the pale lines form reticulations insulating some roundish blotches. (*Richards.*)

Southern Polynesia.

23. Tetrodon psittacus.

Tetrodon psittacus, *Bl. Schn.* p. 505, tab. 95.

Chelichthys psittacus, *Müll. & Trosch. in Schomburgk, Brit. Guiana*, iii. p. 641; *Steindachner, Verh. zool.-bot. Ges. Wien*, 1861, p. 141, taf. 4. fig. 2.

—— asellus, *Müll. & Trosch. l. c.*

Body covered with small, two-rooted spines, except on the snout, round the pectoral fin, and caudal peduncle; only in very old examples are there any spines on the back behind the dorsal fin. All the spines on the sides have their points turned upwards towards the back. Snout very obtuse, one-third of the length of the head, and somewhat less than the width of the interorbital space, which is convex. Eye small, about one-third of the length of the snout, and in large examples comparatively even still smaller. Length of the caudal fin more than its distance from the dorsal fin. Brownish, with six dark-brown bands across the back; the two bands between the pectoral and dorsal fins sometimes confluent into one.

Vert. 8/11.

Fresh waters of the Guyanas and Brazil.

a, b. Half-grown. Essequibo River. From Hr. Ehrhardt's Collection.

c, d, e–f, g–h. Half-grown and young. British Guyana.

i, k, l–n. Adult and half-grown. Surinam.

o. Adult (13 inches): stuffed. Surinam. From the Collection of Dr. van Lidth de Jeude.

p, q. Half-grown. River Capin, Pará. From Mr. Bates's Collection.

r. Half-grown. Jamaica (??). Purchased.

s, t. Adult and young.

u. Adult: skeleton. Surinam. From the Collection of Dr. van Lidth de Jeude.

c. *No fold along the lower parts. Skin entirely smooth*: Liosaccus, *m.*

24. Tetrodon cutaneus.

Skin entirely smooth, thin, forming innumerable very fine longitudinal wrinkles on the back and sides; no fold along the lower side of the tail. Snout obtuse, rather long, the eye being much nearer to the gill-opening than to the end of the snout. Eye of moderate size, with free orbital fold, two-ninths of the length of the head, two-fifths of that of the snout, and not much less than the width of the interorbital space, which is flat. The length of the head is rather more than its distance from the dorsal fin, which is small, nine-rayed. Caudal fin short, truncated. Upper parts and sides uniform greenish grey, the lower white. Two lateral nostrils in a short tube.

St. Helena; ? Cape of Good Hope.

a–b. Adult. St. Helena. Presented by J. C. Melliss, Esq. (xxxiii.).
c. Stuffed, 12½ inches long. ? Cape of Good Hope. Presented by Sir A. Smith.

25. Tetrodon pachygaster.

Tetrodon (Cheilichthys) pachygaster, *Müll. & Trosch. in Schomburgk, Barbadoes*, p. 677.

D. 10. Smooth all over, of a light brown colour, with darker spots on the back. The space between the eyes is equal to two diameters of the eye, and the space to the top of the snout is of similar extent. The nostrils are nearer to the eye than to the snout, and they are papillary, with two apertures. The dorsal fin stands before the anal; the caudal is truncated, but the upper and lower points are somewhat elongated.

Length 14 inches. It is a very scarce species around Barbadoes.

26. Tetrodon porphyreus.

Tetraodon porphyreus, *Schleg. Faun. Japon. Poiss.* p. 282, pl. 121. fig. 1.

Skin entirely smooth, without spines or tubercles. No fold or lateral line along the lower part of the tail. Fourteen dorsal rays. Above brownish, with minute whitish dots; below whitish. (*Schleg.*)

Japan.

27. Tetrodon angusticeps.

Tetrodon angusticeps, *Jenyns, Voy. Beagle, Fish.* p. 154, pl. 28.
Anchisomus angusticeps, *Richards. Voy. Herald, Fish.* p. 159.

Skin entirely smooth, but harsh to the finger when drawn over it in an atlantal direction; and under a lens it is seen to be divided into minute, slightly elevated, flattish areas of very irregular form, but mostly tending to the orbicular. Two small skinny appendages a little behind the transverse line on the nape (according to *Jenyns*; but *Richardson* states that there are five such processes, not symmetrically disposed, and seemingly the effects of the attacks of some parasite). Interorbital space reduced to a narrow channel, much hollowed out, and not exceeding one diameter of the eye. Eight or nine dorsal rays. Uniform reddish brown (in spirits).

Galapagos archipelago.

B. *Nasal openings one on each side; it is in a simple tube, which is sometimes two-lipped at the extremity. Body spiny.*

28. **Tetrodon palembangensis.**

Tetraodon palembangensis, *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 25, or *Nat. Tyds. Ned. Ind.* iii. p. 605.

Crayracion palembangensis, *Bleek. Atl. Ichth. Gymnod.* p. 67, pl. 4. fig. 3.

The whole body, with the exception of the lips and hind part of the tail, is studded with small spines, each of which is accompanied by a small tentacle. Snout depressed and short, the eye being considerably nearer to the end of the snout than to the gill-opening. Interorbital space very broad and flat, the osseous part being narrow. Brown above, white below; body with a network of wide brown meshes, many of those on the side enclosing a large black ocellus edged with whitish. Fins immaculate.

Rivers of Sumatra and Borneo; Siam.

a. One of the typical specimens. From Dr. Bleeker's Collection.
b. Half-grown. Presented by the Royal College of Surgeons.
c. Half-grown: stuffed. Siam. From M. Mouhot's Collection.

29. **Tetrodon liurus.**

Tetraodon leiurus, *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* pp. 18, 22, or *Nat. Tyds. Ned. Ind.* iii. p. 440.

Crayracion leiurus, *Bleek. Atl. Ichth. Gymnod.* p. 67, pl. 9. fig. 1.

The whole body, with the exception of the fore part of the snout and the caudal peduncle, is covered with small spines. Snout rather depressed, produced, conical, the eye being conspicuously nearer to the gill-opening than to the end of the snout. Interorbital space flat, its entire width being equal to the length of the snout. Brownish above, whitish below; head and body, except in the middle of the abdomen, with numerous larger and smaller round dark-brown spots, some of which have a lighter edge. Fins immaculate.

Rivers of Java, Sumatra, and Borneo.

a. One of the typical specimens, 4½ inches long. From Dr. Bleeker's Collection.

C. *A simple, non-perforate nasal cavity with a fringed edge. Body spiny:* Chelonodon (*Müll.*).

30. **Tetrodon patoca.**

Kappa, *Russell*, i. p. 18, fig. 25.

Tetrodon patoca, *Ham. Buch.* pp. 7, 363, pl. 18. fig. 2: *Bibron, Rev. Zool.* 1855, p. 280.

Tetrodon dissutidens, *Cant. Mal. Fish.* p. 382.
—— kappa, *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 16, xxv. *Beng.* p. 160, or *Nat. Tyds. Ned. Ind.* iii. p. 301.
Leiodon patoca, *Bleek. Atl. Ichth. Gymnod.* p. 76, pl. 6. fig. 2.

Back and abdomen densely covered with very small spines, the snout and tail and a band along the side being naked. Snout obtuse, convex, its length being less than the width of the interorbital space, which is rather convex. Upper parts brownish, with more or less numerous round whitish spots. Sides silvery; abdomen white.

Vert. 8/11.

Coasts of the East Indies.

a. Adult (13 inches): stuffed. Bengal. From the Collection of the East-India Company.
b, *c*, *d–e*. Adult and young. Bengal.
f. Young. Singapore.
g. Adult: skin. Pinang. From Dr. Cantor's Collection.—Type of *T. dissutidens*.
h. Adult. Amboyna. Purchased of Hr. Frank.
i, *k*. Adult and young. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
l, *m*, *n*, *o–p*. Half-grown and young. India.
q. Half-grown. China. Presented by J. R. Reeves, Esq.
r–s. Adult: skeletons.

31. Tetrodon viridipunctatus.

Leiodon viridipunctatus, *Day, Proc. Zool. Soc.* 1865, p. 315, or *Fish. Malab.* p. 258, pl. 20.

The spines, commencing from the occiput, pass along the back two-thirds of the distance towards the commencement of the dorsal fin; abdomen entirely covered with spines. Upper parts light green, with emerald-green spots; a bar of the same colour passes from one eye to the other, and also goes backwards in the mesial line towards a second irregular band of the same colour, which crosses the back more posteriorly. Abdomen white. Four black spots under the throat. (*Day*.)

Cochin.

32. Tetrodon waandersii.

Tetraodon waandersii, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 194.
Leiodon waandersii, *Bleek. Atl. Ichth. Gymnod.* p. 76, pl. 10. fig. 3.

Snout and tail naked, the remainder with small and rather distant spines. Greenish, with numerous black transverse lines on the side of the tail.

Banka.—Known from a single young specimen only.

a. Type of the species, 45 millims. long. From Dr. Bleeker's Collection.

D. *A simple circular nasal cavity. Body smooth*: Monotretus (*Bibr.*).

33. Tetrodon cutcutia.

Tetrodon cutcutia, *Ham. Buch. Fish. Gang.* p. 8, pl. 18. fig. 3; *Bleek. Verh. Bat. Gen.* xxv. *Nalez. Beng.* p. 160.
—— caria, *Ham. Buch.* p. 9.
—— gularis, *Ham. Buch.* p. 10.

Body entirely naked. Snout short and obtuse, but the eye is nearer to the gill-opening than to the end of the snout. The interorbital space is flat, entirely bony, forming somewhat prominent superciliary edges; its width is nearly two-thirds of the length of the head. Sides with a network of brownish lines, and with a large black ocellus edged with white in front of the vertical from the origin of the dorsal fin. Sometimes the black ocellus is absent.

Ganges. Only 4 inches long.

a, *b*, *c*. Many adult, half-grown, and young specimens. Calcutta.

E. *On each side two solid nasal tentacles without opening*: Arothron (*Müll.*).

34. Tetrodon fahaka.

Orbis, *Salvian.* fol. 209 (cop. by *Willughby*, tab. J 1); *Rondel. De Pisc.* p. 419.
Ostracion, sp. no. 11, *Artedi, Gen.* p. 58.
Tetraodon fahaka, *Hasselqu. Itin.* p. 400; *Forsk.* p. 76. no. 114; *De Joannis, in Mag. Zool.* 1835, iv. pl. 2.
—— lineatus, *L. Syst. Nat.* p. 411; *Lacép.* i. pp. 475, 497.
—— physa, *Geoffr. St.-Hil. Descr. Eg. Poiss. Atl.* pl. 1. fig. 1, and pl. 2 (anatomy).
—— strigosus, *Bennett, Proc. Zool. Soc.* 1834, p. 46.

Minute spines cover the back, sides, and the abdomen, leaving the snout, root of the pectoral, and entire tail naked. The abdominal spines have five or six roots. Snout short, one-third of the length of the head, and less than the width of the flat interorbital space. Length of the caudal fin equal to its distance from the front margin of the dorsal. Seven blackish bands, the lower of which are sometimes inconspicuous, run in a slightly oblique direction from the pectoral region to the caudal fin and back of the tail. They are as broad as, or rather broader than, the whitish interspaces. Abdomen white, without spots.

Vert 8/10.

West Africa; Nile.

a. Adult (18 inches): stuffed. Senegal. Purchased of M. Parzudaki.

b. Half-grown. River Quorra. From the Collection of the Zoological Society.—Type of *T. strigosus*, Benn. The spines are hidden in the thick skin of the abdomen.

c. Half-grown. West Africa. Purchased of Mr. Dalton.

d–e. Adult. Chartoum. From Mr. Petherick's Collection.

f–g. Half-grown and young: stuffed. Lower Nile.

h–i. Half-grown: stuffed.
k–l. Adult: skeletons. Nile.

35. Tetrodon pustulatus.

Tetraodon pustulatus, *Murray, Proc. R. Phys. Soc. Edinb.* 1857.
—— leiogaster, *John Alexander Smith, ibid.* 1865, p. 268.

Body covered with minute spines, the hind part of the tail and the snout being naked. Snout obtuse, the eye being nearer to its extremity than to the gill-opening, and its length is less than the width of the interorbital space, which is very broad and nearly flat. Length of the caudal fin equal to its distance from the front margin of the dorsal. Blackish brown above, whitish below; on the side ten or less round yellow spots, broadly edged with black, and about as large as the eye.

Vert. 8/14.

West coast of Africa.

a–b. Adult (14 inches). Old Calabar. Presented by A. Murray, Esq.—Types of the species.
c. Half-grown. West Africa. Purchased of Mr. Cutter.
d. Adult: skeleton. West Africa. Purchased of Mr. Cutter.

36. Tetrodon immaculatus.

α. Synonymy of var. immaculata.

Tétrodon sans tache, *Lacép.* i. pp. 475, 486, pl. 24. fig. 1.
Tetrodon immaculatus, *Bl. Schn.* p. 507; *Cant. Mal. Fish.* p. 373.
Kappa, *Russell*, i. p. 19, pl. 26.
Tetraodon sordidus, *Rüpp. Atl. Fisch.* p. 64, and *N. W. Fisch.* p. 60, taf. 16. fig. 4.
—— parvus, *De Joannis, Mag. Zool.* 1835, iv. pl. 15.
—— scaber, *Eyd. & Soul. Voy. Bonite, Poiss.* p. 214, pl. 10. fig. 1.
? Tetrodon basilevskianus, *Basil. Nouv. Mém. Soc. Nat. Mosc.* x. 1855, p. 262.
—— aspilus, *Bleek. Nat. Tyds. Ned. Ind.* ii. p. 495, or *Verh. Bat. Gen.* xxiv. *Blootk.* p. 22.
—— kunhardti, *Bleek. l. c.* 1°, i. p. 97, and *l. c.* 2°, p. 23.
Arothron scaber, *Bleek. l. c.* 1°, ix. p. 112.
—— immaculatus, *Bleek. l. c.*
Crayracion immaculatus, *Bleek. Atl. Ichth. Gymnod.* p. 75, tab. 7. fig. 1.

β. Synonymy of var. virgata.

Tetrodon manillensis, *Procé, Bull. Philom.* 1822, p. 130.
—— virgatus, *Richards. Voy. Ereb. & Terr. Fish.* p. 62, pl. 39. figs. 8 & 9, and *Voy. Herald, Zool.* p. 163, pl. 28. figs. 6–8; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 24, or *Nat. Tyds. Ned. Ind.* iii. p. 299.
Holocanthus pilosus, *Gronov. Syst.* ed. *Gray*, p. 28.
Dibolomycter longicaudus, *Bibron, Guér. Rev. Zool.* 1855, p. 279.
Crayracion manillensis, *Bleek. Atl. Ichth. Gymnod.* p. 69, pl. 4. fig. 2 (black caudal margins omitted).

Small spines cover the entire body, with the exception of the lips and the posterior half of the tail. Snout short and obtuse, rather more than two-fifths of the length of the head, and equal to the width of the interorbital space, which is flat. Length of the caudal fin equal to its distance from the front margin of the dorsal. *Caudal fin with the upper and lower margins black*; root of the pectoral black. Vert. 8/10.

From the Red Sea to Polynesia and Australia.

Var. α. immaculata. *Body without spots or bands.*

a–b. Half-grown. Port Natal. From Mr. Ayres's Collection.
c–d. Adult (11 inches) and young: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
e. Young. Zanzibar. From Lieut.-Col. Playfair's Collection.
f. Adult: stuffed. Mauritius. Purchased of Mr. Cuming.
g. Young: skin. Penang. From Dr. Cantor's Collection.
h, i, k. Adult and half-grown. East-Indian archipelago.
l. Half-grown. New Caledonia. Purchased of Mr. Cuming.
m. Adult (12 inches): stuffed. Australia. Purchased of Mr. Gould.
n. Young. Australia. Presented by the Earl of Derby.
o–p. Adult: stuffed.
q–r. Adult: skeletons. East-Indian archipelago.

Var. β. virgata. *Body and sides with from six to twelve parallel greyish longitudinal lines on each side.*

s. Adult (10 inches). Ceram. Purchased of Mr. Stevens.
t. Adult. Amboyna. Purchased of Hr. Frank.
u. Half-grown. Philippine Islands. Purchased of Mr. Cuming.
v. Half-grown. Cape York (North Australia). Purchased of Hr. Dämel.
w. Half-grown. Port Jackson. Presented by Sir J. Richardson. —Type of *T. virgatus*.
x. Young. Sydney. Presented by G. Krefft, Esq.
y. Half-grown. Micronesia. Purchased of Mr. Wright.
z–α. Adult and young. Voyage of the 'Herald.'
β. Adult: skeleton. From Dr. Bleeker's Collection.

Tetrodon carduus, Cant. Mal. Fish. p. 375, from Pinang, is probably another variety of *T. immaculatus*, but it wants the black margins of the caudal fin, which are so characteristic of that species. Upper parts with a number of parallel blackish longitudinal lines; sides with a few blackish spots; abdomen immaculate; caudal fin with black spots.—This form is known from a single example only.

a. Skin, 6 inches long. From Dr. Cantor's Collection.

Crayracion cochinensis, Day, Proc. Zool. Soc. 1865, p. 314, or Fish. Malabar. p. 258, pl. 20. fig. 2, is, without doubt, identical with *T. immaculatus*. The black caudal bands may have disappeared in the single example, which, like most specimens in this author's collection, was a dried skin. A whitish spot above the eye is also sometimes observed in examples of *T. immaculatus*.

37. Tetrodon nigropunctatus.

Tetrodon nigropunctatus, *Bl. Schn.* p. 507.
Tetraodon trichoderma, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 532.
—— trichodermatoides, *Bleek. l. c.* vi. p. 336.
Arothron melanorhynchus, *Bleek. l. c.* ix. p. 111.
Crayracion nigropunctatus, *Bleek. Atl. Ichth. Gymnod.* p. 74, pl. 2. fig. 4.

This species varies in a remarkable manner in the extent of the spines over the body: sometimes they project much out of the skin, and cover nearly the entire body like bristles; sometimes they are much less numerous, and nearly entirely hidden in the skin, the greater part of which appears to be smooth. Snout rather short and obtuse, two-fifths of the length of the head. The interorbital space appears flat and broad externally; but the width of the osseous portion is much less than the length of the snout, and about twice the diameter of the eye. Length of the caudal fin equal to its distance from the dorsal. Uniform dark brown above and whitish below; a few scattered round black spots on the side; vent black. Fins and base of the fins not spotted. Caudal fin sometimes with a white, never with a black, margin. Mouth black.

Indian Ocean and archipelago; Feejee Islands.

a–b. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
c–d. Adult and half-grown. Amboyna. Purchased of Hr. Frank.
e, f. Adult. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
g. Adult (9 inches). Flores. From Dr. Bleeker's Collection.—Type of *T. trichodermatoides*.
h. Adult. Sumatra. From Dr. Bleeker's Collection.—Type of *T. trichoderma*.
i. Adult. Halmaheira. From Dr. Bleeker's Collection.—Type of *T. melanorhynchus*.

Var. *citrinella*. The entire body of a beautiful lemon-colour. Beside the scattered spots on the side, there are some irregular small and large black spots on the back; one large blotch round the base of the dorsal fin, which also is black. A large round black spot round the eye and gill-opening.

k. Adult: stuffed. Feejee Islands. Voyage of H.M.S. 'Herald.'

Tetraodon diadematus, Rüpp. Atl. Fisch. p. 65, pl. 17. fig. 3, from the Red Sea, approaches closely the variety just mentioned. The entire fish is nearly uniform greenish; but the mouth is black, and a broad black band runs from one eye to the other and on to the gill-opening.

38. Tetrodon mappa.

Tetraodon mappa, *Less. Voy. Coq. Poiss.* p. 102, pl. 5.
—— reticulatus, *Bleek. Verh. Bat. Gen.* xxii. *Madura*, p. 16, and xxiv. *Blootk.* p. 18 (young).

Tetraodon calamaroides, *Bleek. l. c.* xxiv. p. 16, or *Nat. Tyds. Ned. Ind.* i. p. 96 (adult).
—— meleagris, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 91 (not synon.).
Crayracion mappa, *Bleek. Atl. Ichth. Gymnod.* p. 72, pl. 6. fig. 3 (adult).
—— meleagris, *Bleek. l. c.* fig. 1 (young).

Nearly the entire body covered with minute spines, only the foremost part of the snout and the posterior portion of the tail being naked. Snout of moderate length, one-half the length of the head (to the anterior margin of the gill-opening), and much more than the width of the interorbital space, which is flat. Length of the caudal fin equal to its distance from the front margin of the dorsal. Brown above, whitish below. Upper half and caudal fin with vermiculated and subreticulated dark lines, which almost disappear in the dark coloration of the middle of the back. In young individuals those lines are spread over the whole abdomen, forming a network, the meshes of which are at least as wide as the orbit. Old individuals with a large, brown, irregular, subreticulated blotch below the pectoral fin, more or less visible in young individuals. Vent in a black spot; the brown lines radiate from the eye.

Indian Ocean and archipelago.

a. Adult ($12\frac{1}{2}$ inches): stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
b. Adult. East-Indian archipelago. From Dr. Bleeker's Collection as *T. calamaroides.*
c. Five inches long. East-Indian archipelago. From Dr. Bleeker's Collection as *C. meleagris.*

Dr. Bleeker has described this species under two names, confounding the younger state with the *T. meleagris* of Lacépède and Richardson, which is a very distinct species. The figure which he gives of his *C. meleagris* is defective in two very important points; viz., the radiating lines round the eye and the indication of the subpectoral spot are omitted. These two characters are very distinct in the example we received from him, and indicate at once the close affinity with *T. mappa.* The structural identity of the two forms, especially in the snout, is perfect, so that there cannot be any doubt that the one is the younger state of the other.

This species is also most closely allied to *T. stellatus* (*lineatus*), to which I have referred it in 'Fish. Zanz.' p. 131. Having now examined many more examples than at that time, I am inclined to regard it as distinct.

39. **Tetrodon stellatus.**

a. Synonymy of old examples without lateral or abdominal bands or large spots.

Tétrodon étoilé, *Lacép.* i. pp. 474, 483.
—— moucheté, *Lacép.* i. pp. 475, 491.
Tetrodon lagocephalus, var. stellatus, *Bl. Schn.* p. 503.
—— commersonii, *Bl. Schn.* p. 508.

Tetrodon maculatus, *Lefebvre, Voy. Abyss.* vi. p. 237, pl. 7.
—— pantherinus, *Eydoux & Soul. Voy. Bonite, Poiss.* p. 215, pl. 10. fig. 3.
Holocanthus variolosus, *Gronov. Syst.* ed. *Gray*, p. 26.
Crayracion stellatus, *Bleek. Atl. Ichth. Gymnod.* p. 73, pl. 5. fig. 2.

β. Synonymy of examples with lateral bands or spots.

Willughby, Hist. Pisc. tab. J. 3.
Ostracion, sp., *Artedi, Gen.* p. 58. no. 12.
Tétrodon pointillé, *Lacép.* i. pp. 474, 485.
Tetrodon pseudopterus, *Bl. Schn.* p. 508.
Calamarah kappa, *Russell*, i. p. 19, pl. 28.
Tetraodon calamara, *Rüpp. Atl. Fisch.* p. 64, taf. 17. fig. 1; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 15.

γ. Synonymy of examples with abdominal bands.

Tetrodon lineatus, (not *L.*) *Bl. Ausl. Fisch.* i. p. 128, tab. 141; *Bl. Schn.* p. 503; *Peters, Arch. Ntrg.* xxi. p. 274; *Schleg. Faun. Japon. Poiss.* p. 287, tab. 125. fig. 2.
—— aerostaticus, *Jenyns, Zool. Beagle, Fish.* p. 152.
—— astrotænia, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 129.
Arothron lineatus, *Bleek. Verh. Bat. Gen.* xxvi. *N. Nalez. Japan*, p. 40, or *Act. Soc. Sc. Indo-Neerl.* i. *Amboina*, p. 67.
Crayracion lineatus, *Bleek. Atl. Ichth. Gymnod.* p. 70, pl. 2. fig. 1, and pl. 8. fig. 1.
—— astrotænia, *Bleek. l. c.* p. 69, pl. 10. fig. 2.

Small but rather prominent spines cover the entire body, extending forward to or nearly to the lips, and behind nearly to the root of the caudal fin. Snout short, obtuse, two-fifths or rather more than two-fifths of the length of the head, and rather more than the width of the interorbital space, which is flat or but slightly concave. Length of the caudal fin equal to its distance from the dorsal. Abdomen white in old examples, in younger with more or less broad black bands obliquely ascending backwards; they are not very regular, are more or less broken up or confluent, sometimes disappearing towards the middle of the abdomen. Vent with a black ring. All the upper parts with black or brown dots, which are confluent into parallel stripes in very young individuals. Fins with brown spots, sometimes absent on the dorsal and anal fins. Some black spots round the root of the pectoral.

Vert. 8/10.

Indian Ocean and archipelago; Pacific.

On examining a large series of examples it will be found that the abdominal bands gradually disappear: it seems as if they disappeared with age. However, we have examples about 6 inches long, some of which have scarcely a trace of the bands left.

Var. α. Large examples spotted above, but without abdominal bands or large lateral blotches.

a. Adult (23 inches): stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.

b. Adult (12 inches). East-Indian archipelago. From Dr. Bleeker's Collection.
c–d. Adult: stuffed. India.
e–f. Adult (22 and 13 inches): stuffed. Australia.
g–i. Thirty inches long: stuffed.

Var. β. Sides of the abdomen with from two to six oblique black spots, those nearest to the pectoral fin being the last to disappear.

k. Half-grown (8½ inches). Madras. From Mr. Day's Collection.
l. Half-grown. Amboyna. Purchased of Hr. Frank.
m–n. Half-grown: stuffed.
o. Young (4½ inches).

Var. γ. Abdomen with oblique black bands.

p–q. Young. Port Natal. From Mr. Ayres's Collection.
r–s. Young: skins. Zanzibar. From Lieut.-Col. Playfair's Collection.
t. Five inches. East-Indian archipelago. From Dr. Bleeker's Collection.
u. Young. Amboyna. Purchased of Hr. Frank.
v. Very young. Amboyna. From Dr. Bleeker's Collection.—Type of *T. astrotænia*.
w. Half-grown (6 inches). Japan.
x. Half-grown. Feejee Islands. Voyage of the 'Herald.'

40. Tetrodon reticularis.

Tetrodon testudineus, (not *L.*) *Bl. Ausl. Fisch.* i. p. 123, tab. 139; *Lacép.* i. p. 477; *Bl. Schn.* p. 502; *Shaw, Zool.* v. p. 444, pl. 178; *Cant. Mal. Fish.* p. 376; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 14, or *Nat. Tyds. Ned. Ind.* iii. p. 78.
—— reticularis, *Bl. Schn.* p. 506.
Arothron testudinarius, *Müll. Arch. Ntrg.* ix. p. 330.
Crayracion testudineus, *Bleek. Atl. Ichth. Gymnod.* p. 71, pl. 8. fig. 3; *Day, Fish. Malabar,* p. 257.

Very small spines cover the whole body from the nostrils to the root of the caudal fin; those on the abdomen with two, three, or four roots. Snout short and obtuse, about one-third of the length of the head, and two-thirds of the width of the broad and flat interorbital space. Length of the caudal fin equal to its distance from the front margin of the dorsal. Abdomen with rather numerous brown or black longitudinal bands, obliquely ascending over the cheeks to the upper part of the head, and passing on the side into a brown network, the meshes enclosing round whitish spots. On the back the brown is the ground-colour, with round whitish spots. Caudal fin with round yellowish spots, separated by a blackish network.

Vert. 8/10.

East-Indian Ocean and archipelago.

a, b, c. Adult and young. East-Indian archipelago.
d, e–f. Half-grown and young. Amboyna.

g. Half-grown. Celebes.
h. Young: skin. Pinang. From Dr. Cantor's Collection.
i–l. Adult (17 inches): stuffed. Indian Ocean.
m, n, o. Adult and young.
p. Adult: skeleton. Purchased.

41. Tetrodon hispidus.

?? Tetrodon hispidus, *L. Syst. Nat.* i. p. 411 (not synon.).
? Tetrodon hispidus, *Bl. Ausl. Fisch.* i. p. 130, tab. 142; *Bl. Schn.* p. 504.
Tetrodon hispidus, *Lacép.* i. p. 487, pl. 24. fig. 1; *Richards. Voy. Samar. Fish.* p. 17, pl. 9. figs. 3 & 4.
Tetraodon perspicillaris, *Rüpp. Atl. Fische*, p. 63.
—— semistriatus, *Rüpp. N. W. Fische.* p. 58, pl. 16. fig. 3.
Tetrodon implutus, *Jenyns, Voy. Beagle, Fish.* p. 152.
—— stellatus, *Eyd. & Soul. Voy. Bonite, Poiss.* p. 212, pl. 10. fig. 2 (not *Lacép.*).
—— laterna, *Richards. Voy. Sulphur, Zool.* p. 124, pl. 61. fig. 2, and *Ichth. Chin.* p. 199; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 23, or *Nat. Tyds. Ned. Ind.* iii. p. 299; *Günth. Fish. Zanz.* p. 131.
Crayracion implutus, *Bleek. Atl. Ichth. Gymnod.* p. 71.
—— laterna, *Bleek. l. c.* pl. 1. fig. 3.

Very small spines cover the whole body from the snout to the space between dorsal and anal fins, the hind part of the tail being naked; abdominal spines with two, three, or four short roots. Snout of moderate length, with the upper profile slightly concave. Orbit prominent, situated in the middle of the length of the head. Interorbital space concave, not twice as broad as the orbit. Length of the caudal fin equal to its distance from the front margin of the dorsal. Brown above, with not very numerous rounded bluish-white spots. One or two bluish rings round the gill-opening and pectoral, and round the orbit. The coloration of the lower parts varies:—

Var. α. Four or five subvertical black blotches along each side of the abdomen. These spots are generally crossed by incomplete whitish longitudinal bands (thus approaching var. β), the remainder of the abdomen white: *T. perspicillaris, hispidus.*

Red Sea and Eastern Africa; Ceylon.

a–b. Half-grown. Red Sea. Presented by Dr. A. Günther.
c. Adult: dried (18 inches). Red Sea. Presented by Sir G. Wilkinson.
d. Adult. Zanzibar. Presented by Lieut.-Col. Playfair.
e–f. Adult: stuffed. Zanzibar. Presented by Lieut.-Col. Playfair.
g. Young. Mozambique. Presented by Dr. Livingstone.
h. Half-grown. Port Natal. From Mr. Ayres's Collection.
i. Adult: stuffed. Ceylon. From Dr. Kelaart's Collection.
k–l. Adult and young. From the Collection of the Zoological Society.
m. Half-grown. (Atlantic ??) Presented by Sir J. Richardson (*T. hispidus*).
n. Adult: stuffed. Old Collection.

Var. β. Numerous blackish longitudinal lines run along the abdomen, but do not ascend to the cheek; the portion of the lines below the ante- and postpectoral region is frequently darker than the rest (thus indicating the spots on var. *α*): *T. semistriatus, implutus*, or *laterna*.

From the Red Sea to the Australian seas.

o. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
p. Young. Amboyna. Purchased of Hr. Frank.
q. Half-grown. Australia. From Mr. Strange's Collection.
r. Adult (20 inches): stuffed. Aneiteum. Collected by Mr. McGillivray.
s. Adult: stuffed. Purchased.

42. **Tetrodon bondarus.**

Bondaroo kappa, *Russell*, i. pl. 27.
Tetrodon bondarus, *Cant. Mal. Fish.* p. 377.

Very small spines cover the whole body, only the lips and hindmost part of the tail being naked. Length of the snout more than the width of the interorbital space, but less than half the length of the head; orbit rather prominent. Interorbital space flat. Upper parts blackish olive, with numerous rounded brownish-white spots, many of which are surrounded by a broad black ring, forming a kind of interrupted network. Inside and behind the pectoral fin a large black spot, in which a bright yellow half-ring; a yellow spot in front of the pectoral fin. On the side of the head a large black spot like an erect horseshoe; *on the throat a round black spot, whence a widely arched black line ascends to each pectoral fin.* Caudal fin with indistinct whitish spots and a broad black margin.

Pinang; Vizagapatam.

a. Type of the species: skin ($5\frac{1}{2}$ inches long). Pinang. From Dr. Cantor's Collection.

43. **Tetrodon erythrotænia.**

Tetraodon erythrotænia, *Bleek. Nat. Tyds. Ned. Ind.* v. p. 174.
Crayracion erythrotænia, *Bleek. Atl. Ichth. Gymnod.* p. 68, pl. 10. fig. 4.

Spines not numerous, hidden in the skin, not extending on to the snout and tail. Snout short and obtuse, not much longer than the eye, which is one-half of the width of the flat interorbital space. Eye in the middle of the length of the head. Length of the caudal fin equal to its distance from the commencement of the dorsal. Upper and lateral parts uniform brownish black, the lower white, both colours being defined by a sharp line, which is red in life.

Rivers of Celebes and Amboyna. A small species.

a. One of the typical examples, $2\frac{2}{3}$ inches long. From Dr. Bleeker's Collection.
b. Two a half inches long. Amboyna. Purchased of Mr. Stevens.

44. Tetrodon meleagris.

Tetrodon meleagris, *Lacép.* i. pp. 476, 505; *Bl. Schn.* p. 507; *Richards. Voy. Sulphur, Fish.* p. 122, pl. 57. figs. 1–3.

? Tetrodon lacrymatus, (*Cuv.*) *Quoy & Gaim. Voy. Uran. Poiss.* p. 204.

The entire body densely covered with small spines from the lips to nearly the root of the caudal fin. Snout short, one-third of the length of the head (to the base of the pectoral fin), *and equal to the width of the interorbital space,* which is flat. Upper profile of the snout concave. Length of the caudal fin rather less than its distance from the dorsal. Brown, all parts covered with small whitish spots, largest on the abdomen, but not larger than the eye or wider than the ground-colour between them; they are smallest, merely dots, on the chest and throat, and very distinct on all the upper parts.

Polynesia.

a. Five and a half inches long. Presented by Vice-Admiral Sir E. Belcher.

45. Tetrodon firmamentum.

Tetraodon firmamentum, *Schleg. Faun. Japon. Poiss.* p. 280, pl. 126. fig. 2; *Bleek. Verh. Bat. Gen.* xxvi. *N. Nalez. Japan,* p. 124.

Small two-rooted spines cover the entire body, except the snout and the posterior part of the caudal peduncle; there are about fifty spines in a longitudinal series between the nostril and dorsal fin. The length of the snout is contained twice and two-thirds in that of the head, and a little less than the width of the interorbital space, which is rather convex. Greyish above, lighter below, all parts with ovate white spots, smaller than the eye and than the interspaces of the ground-colour.

Japan.

a. Stuffed, 11½ inches long. From the Leyden Museum.—One of the typical specimens.

46. Tetrodon fluviatilis.

Tetrodon fluviatilis, *Ham. Buch. Fish. Gang.* p. 6, pl. 30. fig. 1.

—— nigroviridis, *Procé, Bull. Philom.* 1822, p. 130.

—— simulans, *Cantor, Mal. Fish.* p. 374.

—— potamophilus, *Bleek. Verh. Bat. Gen.* xxii. *Madura,* p. 16, or xxiv. *Blootk.* p. 17.

Arothron dorsovittatus, *Blyth, Journ. As. Soc. Beng.* xxix. 1861, p. 173.

Crayracion fluviatilis, *Bleek. Atl. Ichth. Gymnod.* p. 68, pl. 6. fig. 4; *Day, Fish. Malab.* p. 256.

Body apparently smooth, the spines being hidden in the skin; they are not very numerous, and do not extend on to the snout and tail. Snout short and obtuse, nearly twice the length of the eye, which is somewhat nearer to the end of the snout than to the gill-opening. Interorbital space very broad and convex. Length of the caudal fin equal to its distance from the front margin of the dorsal fin. Upper parts black with vermiculated greenish lines, or greenish with round black spots; lower parts uniform whitish, or blackish, or with numerous irregular black spots.

Fresh waters and coasts of the East Indies.

a. Adult (6 inches). Ceylon. Presented by Sir J. E. Tennant.
b. Half-grown. Malabar. From Mr. Day's Collection.
c. Young. Singapore.
d–e. Adult and half-grown: skins. Pinang. From Dr. Cantor's Collection.—Types of *T. simulans*.
f–h. Half-grown and young. Borneo. Presented by the Marquis Doria.
i–k. Half-grown and young. Borneo.
l. Adult ($6\frac{1}{2}$ inches). East-Indian archipelago. From Dr. Bleeker's Collection.—One of the types of *T. potamophilus*.
m, n. Half-grown. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
o. Half-grown. Philippine Islands. Purchased of Mr. Cuming.
p. Half-grown: stuffed. India.

II. *Nasal organs quite inconspicuous. Back compressed into a keel*: Anosmius (*Ptrs.*).

47. Tetrodon margaritatus.

? *Paterson, Phil. Trans.* vol. lxxvi. p. 382, tab. 13.
? Tetrodon electricus, *Gm. L.* i. 1445; *Bl. Schn.* p. 507.
Tetraodon margaritatus, *Rüpp. Atl. Fisch.* p. 66.
Tetrodon solandri, *Richards. Voy. Sulph. Fish.* p. 125, pl. 57. figs. 4–6; *Voy. Samarang, Fish.* p. 19.
—— insignitus, *Richards. Voy. Samarang, Fish.* p. 20, pl. 9. figs. 1 & 2 (these figures are twice the natural size).
—— petersii, *Bianconi, Mem. Acad. Sc. Inst. Bonon.* vi. 1855, p. 147, pl. 2. fig. 2.
—— ocellatus, *Peters, Wiegm. Arch.* 1855, p. 274, or *Monatsb. Ak. Wiss. Berl.* 1855, p. 462.

A large black ocellus edged with blue on the back on each side of the dorsal fin. *The snout, sides, and caudal fin with yellowish dark-edged ocelli of the size of the pupil of the eye.* On the upper parts the markings are more or less confluent, forming transverse or angular bluish dark-edged lines; they are most constant round the eye and on the back of the tail. All the lines round the eye are subhorizontal, none vertical. Also, on the posterior part of the caudal fin the ocelli are replaced by subvertical bands. No band on the side of the mouth. Upper profile of the snout slightly concave. Nearly entirely covered with minute spines.

Vert. 8/9.

Eastern coasts of Africa; Tahiti.

a, b, c–d. Adult and half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.
e. Adult: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.

f. Half-grown ($2\frac{1}{4}$ inches long). China. From the voyage of the 'Samarang.'—Type of *T. insignitus*.

g. Type of *T. solandri*. Polynesia. Presented by Sir J. Richardson.

h. Adult: skeleton. Zanzibar.

48. Tetrodon papua.

Valent. Amb. p. 353, fig. 21, and p. 502, fig. 498; *Ruysch, Amb.* p. 9, tab. 5. fig. 10; *Renard*, i. pl. 39. fig. 200, ii. pl. 25. fig. 124.

Tetraodon margaritatus, (not *Rüpp.*) *Bleek. Ver. Bat. Gen.* xxiv. *Blootk.* p. 25, or *Nat. Tyds. Ned. Ind.* iii. p. 302.

—— papua, *Bleek. Journ. Ind. Arch.* ii. p. 638, and *Verh. Bat. Gen.* xxiv. *Blootk.* p. 13.

Tropidichthys margaritatus, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 500.

Canthogaster margaritatus, *Bleek. Atl. Ichth. Gymnod.* p. 81.

Psilonotus margaritatus, *Bleek. l. c.* tab. 9. fig. 4.

A large black spot with incomplete bluish edge, on the back, on each side of the base of the dorsal fin. *Sides of the body and cheeks and caudal fin with numerous, somewhat distant, bluish darker-edged ocelli, smaller than the pupil. The spots on the cheek are not smaller and not more dense than those of the body.* Upper and lateral parts of the snout with oblique bands, the lowermost is the longest and nearly horizontal; eye crossed by subhorizontal bands. *A bluish band runs along the median line of the abdomen to the vent.* Back of the tail with angular bluish bands, the point of the angles being directed backwards. Upper profile of the snout slightly concave. Tail without spines.

East-Indian archipelago.

a. Adult, one of the typical specimens. From Dr. Bleeker's Collection.

b. Adult. Amboyna. Purchased of Hr. Frank.

49. Tetrodon bennetti.

Valent. Amb. p. 417, fig. 223, p. 427, fig. 269, p. 425, fig. 275; *Ruysch, Amb.* pp. 9, 10, tab. 5. figs. 8, 11, 13, & 14; *Renard*, i. tab. 25. fig. 138, ii. tab. 7. fig. 32.

Tetrodon ocellatus, *Bennett, Fish. Ceyl.* p. 21, pl. 21 (not *Bl.*).

Tropidichthys bennetti, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 504.

Psilonotus bennetti, *Bleek. Ned. Tyds. Dierk.* ii. p. 230, or *Act. Soc. Sc. Indo-Neerl. Sumatra*, viii. p. 66.

—— ocellatus, *Bleek. Atl. Ichth. Gymnod.* pl. 10. fig. 5.

Canthogaster ocellatus, *Bleek. l. c.* p. 80.

A large black spot with incomplete bluish edge, on the back, round the base of the dorsal fin. *Sides of the body with round, rather distant bluish spots of the size of the pupil. The spots are small and much more numerous on the side of the head.* Foremost part of the snout with some bluish vertical bands; eye crossed by subhorizontal bands; *a bluish band along the median line of the throat.* Back of the tail with angular bluish bands, the point of the angles being directed backwards. Caudal fin without markings. Upper profile of the snout nearly straight. Only the hindmost part of the sides of the tail is spineless.

Indian Ocean and archipelago.

a. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
b. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—One of the typical specimens.
c. Adult: skin in spirits.

50. **Tetrodon janthinopterus.**

Tropidichthys s. Anosmius s. Psilonotus s. Canthogaster janthinopterus, *Bleek. Nat. Tyds. Ned. Ind.* viii. p. 429; *Atl. Ichth. Gymnod.* p. 82, pl. 9. fig. 2.

A black ocellus on each side of the base of the dorsal fin. Sides of the body and tail with numerous round whitish spots larger than the pupil, and separated from one another merely by a network of the brown ground-colour. Sides of the head with scarcely any spots, but some bluish horizontal lines cross the eye. Back and caudal fin not spotted. Upper profile of the snout nearly straight. Only the free portion of the tail is spineless.

Celebes and Amboyna.

a. One of the typical specimens. From Dr. Bleeker's Collection.

51. **Tetrodon punctatissimus.**

Scarcely distinct from *T. janthinopterus*.

No black dorsal spot. The entire body, forwards to the posterior parts of the head, covered with numerous round whitish spots, smaller than or as large as the pupil, and separated from one another merely by a network of the brown ground-colour. Scarcely a trace of lines crossing the eye. Fins not spotted. Upper profile of the snout slightly concave. Tail and hind part of the trunk spineless. D. 9.

Pacific coast of Panama.

a. Several specimens, $2\frac{3}{4}$ inches long. Panama. From Capt. Dow's Collection.
b. Three inches long. South America. Purchased of Mr. Cuming.

52. **Tetrodon amboinensis.**

Psilonotus amboinensis, *Bleek. Ned. Tyds. Dierk.* ii. p. 180; *Atl. Ichth. Gymnod.* tab. 9. fig. 7.
Canthogaster amboinensis, *Bleek. Atl. Ichth. Gymnod.* p. 79.

Dorsal spot none. *Body with numerous, but rather distant, round or ovate white spots about as large as the pupil, between which black spots similar in size and form are interspersed.* They do not extend on the caudal fin, or only on its basal half. Dorsal fin with 11 or 12 rays.

Indian Ocean and archipelago.

Var. *amboinensis*. The sides of the head in front of the pectoral fin with small ocelli, confluent into subvertical bands in front and below. Caudal fin entirely immaculate.

a. Type of the species. Amboyna. From Dr. Bleeker's Collection.

Var. *natalensis.* The sides of the head in front of the pectoral fin ornamented as the body; cheeks with short horizontal and vertical bluish lines. Basal half of the caudal fin spotted like the body.

b. Fine specimen. Port Natal. From Mr. Th. Ayres's Collection.

53. Tetrodon rostratus.

Tetrodon rostratus, *Bloch, Ausl. Fisch.* ii. p. 8, pl. 146. fig. 2; *Lacép.* i. p. 502; *Bl. Schn.* p. 505.
—— capistratus, *Lowe, Proc. Zool. Soc.* 1839, p. 90.

No dorsal spot. *Caudal fin with the upper and lower margins black, otherwise immaculate.* An irregular brownish band from above the pectoral to the upper caudal margin; in large examples this band is broken up into small spots and undulated lines of a bluish colour. An incomplete bluish median abdominal band. Back above the band immaculate. Sides with bluish ocelli. The upper profile of the snout slightly concave. Spines on the abdomen only, but not very small, and two-rooted.

Madeira; Cape Verde Islands.

a. Adult.
b. Half-grown. Funchal. Presented by the Rev. R. T. Lowe.
c. Half-grown: in bad state. Madeira. Presented by J. Y. Johnson, Esq.
d–e. Half-grown. Porto Prayo. Presented by the Rev. R. T. Lowe.

This is evidently *T. rostratus* of Bloch; he has also indicated the blackish margins of the caudal fin.

54. Tetrodon caudacinctus.

Prilonotus vel Anchisomus caudacinctus, *Richards. Voy. Herald, Fish.* p. 162, pl. 30. figs. 1–3.

Described from a single example in bad condition.

A slight trace of a dark spot exists on the back below the first dorsal rays. Light brown above, whitish below. Some pale dots on the posterior part of the back run into rows near the caudal. *The under half of the tail and chin are crossed transversely by chestnut-coloured bars*; three of the same hue radiate with a curve from the eye towards the nostrils, and four from the eye curve over the temples. There are also some markings of a similar tint on the outer rays of the caudal, and a single purplish line. Tail spineless. (*Richards.*)

Hab. —— ?

Tetrodon ornatus, Poey, Repert. Fis.-nat. Cuba, ii. pp. 244, 433, seems to be most closely allied to the preceding species. It has the vertical bands on the tail, the upper and lower margins of the caudal blue, the upper band being continued on the body; spines on the abdomen only.

West Indies.

a. Adult. St. Croix. Purchased of Mr. Stevens.

55. Tetrodon caudofasciatus.

No black spot on the back. A narrow brownish band runs from the root of the upper caudal ray to above the pectoral, where it is accompanied by a white line, which turns round the root of the pectoral, and runs backwards for some distance, parallel to the brown band. The back above the band and the side of the head are spotted with brown, the spots being small. Upper side of the head with white ocelli and brown spots. A few short subhorizontal lines pass through the eye. Lower parts immaculate. A black spot on the base of the dorsal rays. Caudal fin with about six narrow curved brown bands, the convexity being directed backwards. A vertical cuneiform brown spot across the root of the lower caudal rays. Smooth; only a few spines on the abdomen. Upper profile of the snout straight. D. 10.

Habitat —— ?

a. Three and a half inches long.

56. Tetrodon sanctæ helenæ.

No black dorsal spot. Head and body with numerous, but rather distant, more or less rounded bluish, darker-edged spots, the largest being larger, and the smallest smaller than the pupil. Blue darker-edged lines radiate from the eye. *Caudal fin with six or seven slightly undulated bluish dark-edged vertical bands, about as broad as the interspaces between them.* Throat and abdomen without median line. Abdomen with distinct spines, but the head and remainder of the body are spineless. Upper profile of the snout straight. D. 10.

St. Helena. (Japan ?)

a–b. Adult, 5 inches long. St. Helena. Presented by J. C. Melliss, Esq.

c. Adult. Japan ?

d. Adult.

57. Tetrodon striolatus.

Valentyn, p. 422, fig. 249; *Renard*, i. tab. 25. fig. 138.
Tetraodon striolatus, *Quoy & Gaim. Voy. Uran. Zool.* p. 203.
—— compressus, *Procé, Bull. Soc. Philom.* 1822, p. 130.
Tropidichthys striolatus, *Bleek. Nat. Tyds. Ned. Ind.* vi. p. 503.
Psilonotus striolatus, *Bleek. Atl. Ichth. Gymnod.* tab. 9. fig. 6.
Canthogaster striolatus, *Bleek. l. c.* p. 82.

A large black ocellus edged with blue, on the back, on each side of the dorsal fin. *Body finely striolated with undulated, chiefly longitudinal, lighter and darker lines*; the lower half of the side of the head with small rounded bluish spots. Bluish horizontal lines in front of the eye, crossing the snout. Caudal fin with undulated subvertical lines. No band on the side of the mouth. Upper profile of the snout straight. Only the anterior half of the fish is covered with minute spines.

Vert. 8/9.

East-Indian archipelago.

a. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
b, *c*. Adult. Amboyna.
d. Half-grown. Philippine Islands. From Mr. Cuming's Collection.
e. Adult: skeleton. Amboyna. Purchased of Hr. Frank.

58. **Tetrodon rivulatus.**

Tetraodon rivulatus, *Schleg. Faun. Japon. Poiss.* p. 285, pl. 124. fig. 3.

No black dorsal spot. Upper parts with fine undulated blue lines running in various directions on the neck and anterior half of the back, longitudinal on the upper side of the snout and tail, and descending on the cheeks and side of the snout. Abdomen and sides with numerous orange-coloured dots. Side of the tail with two brownish longitudinal bands running forward to the gill-opening and disappearing with age (in specimens 6 inches long). Caudal fin with oblique and irregular blue lines. Tail spineless. (*Schleg.*)

Nagasaki.

59. **Tetrodon valentini.**

Valent. Amb. p. 353, fig. 19; p. 408, fig. 195; *Renard, Mol.* i. tab. 39 (fig. not numbered); ii. tab. 6. fig. 29; tab. 49. fig. 204; tab. 53. fig. 227; *Ruysch, Amb.* p. 8, tab. 4. fig. 19; p. 12, tab. 7. fig. 7; p. 29, tab. 15. fig. 9.
Ostracion, sp., *Gronov. Mus.* p. 55. no. 126; *Zoophyl.* p. 50. no. 184.
Tropidichthys s. Anosmius s. Psilonotus s. Canthogaster valentini, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 130; *Atl. Ichth. Gymnod.* p. 80, pl. 4. fig. 1.
Holocanthus balistæformis, *Gronov. Syst.* ed. *Gray*, p. 25.
Tetrodon (Anosmius) tæniatus, *Peters, Wiegm. Arch.* 1855, p. 275.

Body with four rather irregular brownish-black cross bands: the first on the occiput; the second above the root of the pectoral fin, and continued below it; the third in front of the dorsal fin, descending nearly to the abdominal edge; the fourth on the back of the tail. The light-coloured parts of the body are covered with numerous orange ocelli.

Indian Ocean and archipelago.

a. One of the typical specimens. Amboyna. From Dr. Bleeker's Collection.
b. Adult. Amboyna. Purchased of Hr. Frank.
c, *d*, *e*. Adult. Zanzibar. Presented by Lieut.-Col. Playfair.
f. Adult: stuffed. Zanzibar. Presented by Lieut.-Col. Playfair.

4. DIODON.

Ostracion, sp., *Artedi.*
Diodon, sp., *L.*, *Cuv.*
Paradiodon, *Bleek.*

Jaws without median suture. Body covered with dermal ossifications, each with a pair of lateral roots and with a stiff, moveable, and erectile spine. Nasal tentacle simple, with a pair of lateral openings.

Seas between the tropics, extending to the Cape of Good Hope.

1. Diodon hystrix.

Histrix piscis, *Clusius, Exot.* vi. c. 23; *Jonston, Hist. Nat. Pisc.* tab. 45. fig. 4; *Willughby, Hist. Pisc.* tab. J 5.
Reversus indicus, *Aldrov. Pisc.* iii. p. 113, tab. 15. fig. 12; *Jonston, l. c.* tab. 3. fig. 1.
Valent. Amb. p. 458, fig. 357; *Renard*, i. p. 9, tab. 5. fig. 32.
Ostracion, sp., *Artedi, Gen.* p. 60. no. 19; *Synon.* p. 86. no. 21; *Gronov. Mus.* ii. p. 40. no. 181, and *Zoophyl.* p. 47. no. 181.
Seba, iii. p. 58, tab. 23. figs. 1 & 2, and p. 62, tab. 24. fig. 10.
Crayracion, sp., *Klein, Pisc. Miss.* iii. p. 20. nos. 13 & 14.
Erizo, *Parra*, p. 60, tab. 29. fig. 1.
Diodon hystrix, *L. Syst. Nat.* i. p. 413; *Bris. Barnev. Rev. Zool.* 1846, p. 141.
—— atinga, *Bl.* tab. 125; *Bl. Schn.* p. 511; *Lacép.* ii. pp. 1 & 3; i. pl. 25. fig. 3; *Kaup, Wiegm. Arch.* 1855, p. 227 (not *L.*).
—— plumieri, *Lacép.* ii. pp. 2 & 10, i. pl. 3. fig. 3.
—— brachiatus, *Bl. Schn.* p. 513.
—— punctatus, *Cuv. l. c.* p. 132; *Bleek. Verh. Bat. Gen.* xxiv. *Blootk.* p. 19.
Holocanthus hystrix, *Gronov. Syst.* ed. *Gray*, p. 27.
Paradiodon hystrix, *Bleek. Atl. Ichth. Gymnod.* p. 56, pl. 3. fig. 2.

Spines strong, dilated at the base, and with a pair of basal grooves; the postpectoral spines are the longest, about as long as the pectoral fin, those of the posterior part of the back short and broad. Frontal spines of medium size. The upper and lower side of the tail with two or three pairs of immoveable spines. All the upper and lateral parts and the fins with numerous small round black or brown spots.

Tropical parts of the Atlantic; Indian Ocean and archipelago; Pacific.

a. Twenty-four inches long. Gaboon. Purchased.
b–c. Large specimens: stuffed. Fernando Po.
d. Half-grown: stuffed. Calabar. Presented by — Nimmo, Esq.
e. Large specimen: stuffed. West Indies.
f–i. Adult and half-grown. Jamaica.
k. Half-grown. Jamaica. Purchased of Mr. Higgins.
l. Half-grown: stuffed. Cape Seas.
m. Half-grown. Amboyna. Purchased of Hr. Frank.
n. Adult: stuffed. Indian Ocean. Purchased.
o. Young. Society Islands. Old Collection.
p. Thirty inches long: stuffed. Presented by S. Blackall, Esq.
q–v. Adult and young: stuffed.

2. Diodon spinosissimus.

Willughby, Hist. Pisc. tab. J 6.
Ostracion, sp., *Artedi, Gen.* p. 60. no. 20.
Crayracion, sp. no. 15, *Klein, Pisc. Miss.* iii. p. 20.
Diodon hystrix, var. β, *L. Syst. Nat.* p. 413.
—— spinosissimus, *Cuv. l. c.* p. 134.
—— melanopsis, *Kaup, l. c.* p. 228.

All the spines long, slender, with an anterior ridge between a pair of grooves, not extending beyond a third of the length of the spine. Upper part of the tail with a pair of spines beside those on the sides. The roots of the spines are strong and long, half as long as the spine, or even longer. There are about seventeen transverse series of spines between the snout and dorsal fin. A more or less distinct blackish band runs from one eye to the other across the throat; sometimes another vertical band in front of the gill-opening. Upper parts blackish, base of each spine with a black spot (not visible in dried examples). Abdomen white.

Cape of Good Hope; Siam.

a. Twelve inches long: stuffed. Cape of Good Hope. Presented by Sir A. Smith.
b. Half-grown. Siam. Purchased of Mr. Jamrach.
c. Adult (11½ inches): stuffed. Old Collection.—This is probably the example from Sir H. Sloane's Collection, examined by Artedi.
d–e. Adult (15 inches) and half-grown: stuffed.—Types of *D. melanopsis* (Kaup).
f. Adult. From the Haslar Collection.
g. Young. From the Collection of the Zoological Society.

3. Diodon maculatus.

Diodon tacheté, *Lacép.* ii. p. 13.
Diodon novemmaculatus, *Cuv. l. c.* p. 136, c. fig.; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 567.
—— sexmaculatus, *Cuv. l. c.* p. 136, c. fig.; *Kaup, l. c.* p. 229.
—— multimaculatus, *Cuv. l. c.* p. 136, c. fig.; *Kaup, l. c.* p. 227.
—— quadrimaculatus, *Cuv. l. c.* p. 137, c. fig.; *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Amboina,* viii. p. 94.
—— spinosissimus, *Kaup, l. c.* p. 228 (not *Cuv.*).
Paradiodon novemmaculatus, *Bleek. Atl. Ichth. Gymnod.* p. 57, pl. 2. fig. 3.
—— quadrimaculatus, *Bleek. l. c.* p. 58, pl. 8. fig. 2.

Spines varying in length, with a distinct ridge along the basal portion; those on the posterior part of the back sometimes fixed by the projecting anterior ridge of the spine. Upper part of the tail without ossifications, but a pair of spines lie alongside, their root being on the side of the dorsal fin. The roots of the spines are strong and long. There are from sixteen to nineteen transverse series of spines between the snout and dorsal fin. Generally some tentacles above the eye, on the throat, abdomen, and back.

Tropical parts of the Atlantic; Indian Ocean and archipelago; Pacific.

Var. α. A broad blackish-brown band between the orbits, extending downwards beyond the eye. A second, parallel to former, across the nape. A large transverse subtriangular spot in the middle of the back. A similar spot on and in advance of the base of the dorsal fin. A kidney-shaped spot above the pectoral. All these bands and spots generally with a light edge. Back and sides with scattered round small black spots. Spines, especially those in front, long, much longer than the eye.

a. Nine inches long. St. Croix. Purchased of Mr. Stevens.
b–f. Half-grown: skins. Jamaica. Purchased of Mr. Parnell.
g, h, i. Adult and half-grown. Panama.
k. Half-grown. South America. From the Haslar Collection.
l. Half-grown: stuffed. Sandwich Islands. From the Collection of the Zoological Society.
m. Half-grown. China. Presented by Sir John Richardson.
n. Young. Sooloo Sea. Presented by R. McLachlan, Esq.
o–q. Half-grown: stuffed. Indian Ocean.
r–t. Adult (10½ inches) and half-grown: stuffed.

Var. β. Coloration as in *α*, but the spines are much shorter, the front spines being sometimes shorter than the eye.

u. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
v. Adult. Amboyna. Purchased of Mr. Frank.

Var. γ. The large spots and bands very similar to those of var. *α* and *β*, but the ground-colour finely dotted all over with black (*D. quadrimaculatus*). Frontal spines longer than the eye.

w. Adult. Amboyna. From Dr. Bleeker's Collection.

Var. δ. The large spots are irregular, not well defined, more or less broken up into smaller spots, mixed with other spots similar in size and form. Frontal spines longer than the eye (*D. multimaculatus*).

x. Young. West Indies. Purchased of Mr. Scrivener.
y. Several young specimens. Cape of Good Hope.
z. Half-grown: stuffed. Cape of Good Hope. Presented by Sir A. Smith.
α. Young. Bourbon.
β. Half-grown. Formosa. From Mr. Swinhoe's Collection.
γ. Young: stuffed.

Atopomycterus bocagei, Steindachner, Sitzgsber. Ak. Wiss. Wien, 1866, liii. p. 477, pl. 6. fig. 3, from Port Jackson. The description of this fish agrees so well with that of *D. maculatus*, that it is very probably identical with this species. The nasal tentacle is said to have been simple on one side and bifid at the extremity on the other; nor has the author found nasal openings.

4. Diodon maculifer.

? Diodon hystrix, *Bl.* taf. 126 (not *L.*).
? —— holocanthus, *Lacép.* ii. p. 11 (after *Bloch*).
Diodon maculifer, *Kaup*, *Wiegm. Arch.* 1855, p. 229.

Spines rather short, strong, remarkably flattened, and compressed transversely. Upper part of the tail without ossifications; but a pair of spines lie alongside, their root being on the side of the dorsal fin. The roots of the spines are strong and long. There are about fifteen transverse series of spines between the snout and dorsal fin. The upper part of the head and body with round black spots, each of about the size of the pupil of the eye. Sometimes the spots above or near to the pectoral are confluent into a blotch. Fins and abdomen immaculate.

Cape of Good Hope; Cuba.

a–c. Adult (10 inches) and half-grown: stuffed. Cape. Presented by Sir A. Smith.
d. Half-grown. Cuba. From the Collection of the Zoological Society.
e–h. Adult and half-grown: stuffed.

Bloch's figure agrees well with this species, but he represents the fins as spotted.

5. CHILOMYCTERUS.

Ostracion, sp., *Artedi.*
Diodon, sp., *L.*, *Cuv.*
Diodon, sp., *et* Chilomycterus, *Bibron, Revue Zool.* 1846, p. 140.
Cyclichthys, Chilomycterus *et* Cyanichthys, *Kaup.*
Diodon *et* Chilomycterus, *Bleeker.*

Jaws without median suture. Body covered with dermal ossifications, all or most of which consist of three horizontal roots and a stiff, erect, immoveable spine. Nasal tentacle simple, with a pair of lateral openings*.

Two groups may be distinguished in this genus:—

α. The foremost spines with two roots only and erectile, p. 309.
β. All the spines three-rooted and immoveable, p. 310.

α. The foremost spines with two roots only and erectile.

1. Chilomycterus calorii.

Diodon calori, *Bianconi*, *Mem. Ac. Sc. Inst. Bonon.* vi. 1855, p. 145.
—— reticulatus, *Günth. in Fish. Zanz.* p. 130 (not synon.†).

---

[*] In some of the species the nasal tentacle is exactly as in the true *Diodon*; but in others (*Ch. tigrinus*, *reticulatus*, &c.) it is more adpressed, and the bridge between the openings thin and easily torn, and then the organ may be described thus:—"Narines non closes au sommet, mais chacune ayant l'apparence de deux lèvres ou formée de deux tentacules réunis à la base."

[†] The synonymy given in the work quoted, and taken from Bleeker's 'Atlas,' p. 54, is entirely erroneous.

The spines are rather short, moderately strong; they are fixed and three-rooted, except the foremost on the head and round the snout, which are erectile and two-rooted. The roots are narrow and rather flat, and the lateral longer than the anterior or than the spine. There are four or five spines above the orbit. Interorbital space slightly concave. There are about seventeen transverse series of spines between the snout and the dorsal fin. A pair of spines on the side of the tail, beside the roots reaching across the back behind the dorsal fin. Inner masticatory plate with about seven transverse grooves. A blackish bar below the eye, another in front of the gill-opening; a blackish blotch behind the pectoral fin; a black spot on each side of the tail, in advance of the dorsal fin. Base of the dorsal fin in a black spot. D. 12. (A. lost.) C. 9. P. 21.

Zanzibar.

a. Stuffed, 9½ inches long. From Lieut.-Col. Playfair's Collection.
b. Very young. From Lieut.-Col. Playfair's Collection.

β. All the spines three-rooted and immoveable.

2. Chilomycterus geometricus.

Guamajacu atinga, *Marcgr. Hist. Pisc.* p. 168; *Willughby*, p. 155, tab. I 8. fig. 2 (bad).
Attinga altera, *Willughby, l. c.* fig. 1.
Petiver, Gazophyl. pl. 69. fig. 1.
Ostracion, sp., *Artedi, Gen.* p. 59. no. 15.
Cyclopterus lumpus, var. β, *Linn. Syst. Nat.* i. p. 414.
Toad-fish, *Schoepff, in Schrift. Ges. ntrf. Freund. Berlin*, viii. p. 192.
Diodon geometricus, *Bl. Schn.* p. 513, taf. 96.
—— maculato-striatus, *Mitchill, Trans. Lit. & Phil. Soc. New York*, i. p. 470, pl. 6. fig. 3; *Dekay, New York Faun. Fish.* p. 323, pl. 56. fig. 185.
—— rivulatus, *Cuv. Mém. Mus.* iv. p. 129, pl. 6; *Jenyns, Zool. Beagle, Fish.* p. 150.
—— nigrolineatus, *Ayres, Journ. Bost. Soc. Nat. Hist.* iv. 1842, p. 68.
—— fuliginosus, *Dekay, l. c.* p. 324, pl. 55. fig. 181.
—— verrucosus, *Dekay, l. c.* p. 325, pl. 56. fig. 184.
Holocanthus areolatus, *Gronov. Syst.* ed. *Gray*, p. 27.
Cyclichthys cornutus, *Kaup, Wiegm. Arch.* 1855, p. 231.
Chilomycterus geometricus, *Kaup, l. c.* p. 232.

Spines strong, but short; two above the orbit, one, more or less prominent, in the middle of the forehead. Superciliary edge raised; generally a tentacle between the superciliary spines; it is prolonged in young examples, and sometimes absent in older ones. Tentacles along the lower part of the side, one on each side of the anal fin being especially developed. Tail spineless; but the roots of one pair of spines reach across behind the dorsal fin. A large black ocellus, edged with lighter, behind the pectoral fin; another, smaller, above it. A black vertical bar below the eye. A black spot on each side of the dorsal fin. Fins immaculate.

Atlantic.

Var. α. Back with narrow light and brown longitudinal stripes (*D. maculato-striatus, rivulatus, geometricus*).

a. Half-grown. United States. Presented by the Smithsonian Institution.
b. Adult. Texas. Purchased of Hr. Brandt.
c. Half-grown. Pontchartrain Lake. From M. Sallé's Collection.
d. Half-grown. Lake Champlain. Purchased of M. Parzudaki.
e. Half-grown. Cuba. From the Collection of the Zoological Society.
f. Adult: stuffed (6 inches). Cape seas. Presented by Sir A. Smith.
g. Adult. From the Haslar Collection.
h. Adult: stuffed (9 inches long).

Var. β. Back with a network of dark lines.

i. Adult (6 inches). Trinidad. Presented by J. B. Richardson, Esq.
k. Adult. From the Haslar Collection.

Var. γ. Body without distinct markings beside the spots described above.

l. Adult (7 inches). Brazil. Purchased of Mr. Higgins.
m. Half-grown. Bahia. Purchased of Mr. Cutter.
n–p. Adult: stuffed.
q. Half-grown. Presented by the Royal College of Surgeons.
r–s. Young. Purchased of Mr. Argent.—Types of *C. cornutus.*

3. Chilomycterus antennatus.

Diodon antennatus, *Cuv. Mém. Mus.* 1818, p. 131, c. fig.; *Jenyns, Zool. Beagle, Fish.* p. 151.
Chilomycterus antennatus, *Kaup, Wiegm. Arch.* 1855, p. 232.

Spines strong, but short; two above the orbit, one, more or less prominent, in the middle of the forehead. Superciliary edge not raised; generally a tentacle between the superciliary spines. Tentacles along the lower part of the side, one on each side and in advance of the anal fin being especially developed. Tail spineless, but the roots of one pair of spines reach across behind the dorsal fin. A black spot in the middle of the nape; a large kidney-shaped spot above the pectoral, and a subtriangular blotch before and along the base of the dorsal fin; generally a small black spot below the eye. Some or all of these spots are edged with lighter. Upper and lateral parts with numerous black dots, some with a bluish pupil. Abdomen brown. Fins unspotted.

Atlantic coasts of tropical America; Cape of Good Hope.

a, b. Adult (8 inches). St. Croix. Purchased of Mr. Stevens.
c–e. Adult: skins. Jamaica. Purchased of Mr. Parnell.
f. Adult: stuffed. Cape of Good Hope. Presented by Sir A. Smith.
g. Adult: stuffed.
h. Adult.

4. **Chilomycterus orbicularis.**

Diodon orbicularis, *Bl.* tab. 127; *Lacép.* ii. p. 16; *Bennett, Whaling Voy.* ii. p. 264; *Barneville, Rev. Zool.* 1846, p. 141; *Bleek. Nat. Tyds. Ned. Ind.* v. p. 92, or *Act. Soc. Sc. Indo-Neerl.* ii. *Amboina,* viii. p. 95, or *Atl. Ichthyol. Gymnod.* p. 55, pl. 1. fig. 4.
—— cæruleus, *Quoy & Gaim. Zool. Uran. Poiss.* p. 201, pl. 65. fig. 5 (young).
—— triedricus, *Cant. Mal. Fish.* p. 371 (not *Cuv.*).

Spines very strong, but rather short; three above the orbit, and one in the middle of the forehead. Superciliary edges raised, convergent towards the front. The roots of the spines are flat, depressed, the anterior with a flattened keel. There are about nine transverse series of spines between the snout and dorsal fin. Nostrils between the frontal spine and the fore part of the superciliary edge. Tail spineless; but the roots of a single pair of spines reach across behind the dorsal fin. Jaws feeble, horizontal, the upper obtusely pointed. The inner masticatory surface is smooth and concave. Brown, irregularly clouded with darker, generally some round black spots on the side.

Indian Ocean and archipelago.

a. Adult: skin (6 inches). Pinang. From Dr. Cantor's Collection.
b. Adult. Ceram. Purchased of Mr. Stevens.
c. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
d. Half-grown: stuffed. Indian Ocean. Presented by Sir A. Smith.
e–h. Half-grown: stuffed.

5. **Chilomycterus echinatus.**

Seba, iii. xxiii. fig. 3.
Ostracion, sp., *Artedi, Gen.* p. 60. no. 18.
Diodon atinga, var. γ, *L. Syst. Nat.* i. p. 413.
Cyclichthys orbicularis, *Kaup, Wiegm. Arch.* 1855, p. 231 (not *Bl.*).
Holocanthus echinatus, *Gronov. Syst.* ed. *Gray,* p. 27.

Spines short and rather feeble; three above the orbit, and one in the middle of the forehead. Superciliary edges not raised, convergent towards the front. The roots of the spines are feeble and compressed into sharp ridges. There are about eleven transverse series of spines between the snout and the dorsal fin. Nostrils between the frontal spine and fore part of superciliary edge. Tail spineless; but the inner roots of a single pair of spines reach across behind the dorsal fin. Jaws strong, the upper with a vertical anterior surface and a median ridge. The inner masticatory surface is provided with two or three transverse pads, divided by a median line. Sides sometimes with round dark spots.

Cape of Good Hope.

a–b. Adult (7 inches): skins. Cape. Presented by Sir A. Smith.
c–e. Adult: skins.

6. Chilomycterus jaculiferus.

Diodon jaculiferus, *Cuv. Mém. Mus.* 1818, p. 130, c. fig.

Two spines above the orbit; none in the middle of the forehead; no tentacle; there are only five spines in a straight longitudinal series from the parietal spine to the side of the dorsal fin. Interorbital space quite flat; nostrils in front of the orbit. The roots of four spines surround the tail behind the dorsal and anal fins. Spines on the lower parts rather feeble. Jaws strong. P. 19. D. 16. A. 15. C. 9. Three black spots on each side of the body, one in front of the gill-opening, one behind the pectoral fin, and a third somewhat in advance of the dorso-anal interspace.

New Zealand.

We possess two examples from New Zealand, one of which is distinguished by the extraordinary length of certain spines (supraorbital, dorsal, postdorsal, and postpectoral), as noticed by Cuvier. In the other example these spines are but slightly enlarged, and, in fact, all the spines are rather feeble. Yet both examples agree so well in the number and arrangement of the ossifications that there is no doubt that they are of the same species, the differences being probably dependent on the sex.

a. Stuffed, 13 inches long. Bay of Wellington.
b. Dried, 13 inches long (fins mutilated). New Zealand. Presented by Dr. Sinclair.

7. Chilomycterus reticulatus.

Orbis muricatus *et* reticulatus, *Willughby*, p. 155, tab. I 7.
Ostracion, sp., *Artedi, Gen.* p. 59. no. 16.
Diodon reticulatus, *L. Syst. Nat.* ed. 10, i. p. 334.
—— atinga, var. β, *L. Syst. Nat.* i. p. 413.
Chilomycterus tigrinus, *Kaup, Wiegm. Arch.* 1855, p. 233 (not *Cuv.*).

Spines very short, compressed, with long, strong, flat, ridged roots, the anterior root being the longest. Forehead flat, without spine. Three feeble supraorbital spines, the inner root of the foremost overlapping the frontal bones. Nostrils in front of the orbit. Generally two osseous stripes across the back of the tail, behind the dorsal fin; abdominal ossifications nearly as much developed as those on the back; there are eight in a longitudinal series nearest to the median line of the back. All the upper parts and *all the fins* are densely covered with small round blackish-brown spots; those of the back are more or less ocellated, and of the size of the pupil; those of the fins are much smaller. P. 12. D. 13. A. 13. C. 10.

Tropical parts of the Atlantic.

a. Skin, 27 inches long. St. Helena. Presented by J. C. Melliss, Esq. (xcix.).
b. Adult: stuffed, 23 inches long. Bermudas. Presented by Capt. Taylor.
c–g. Adult: stuffed.

8. Chilomycterus tigrinus.

Chilomycterus reticulatus, *Bibr. Rev. Zool.* 1846, p. 142 (no descript.; not *L.*).
Diodon tigrinus, *Cuv. Mém. Mus.* 1818, p. 127.
Cyanichthys cæruleus, *Kaup, l. c.* p. 231 (not *Q. & G.*).

Spines short, slightly compressed, with the roots of moderate length. Forehead concave, without spine. Three supraorbital spines, the anterior of which is rather strong, emitting its inner root across the frontal bone. Nostrils in front of the orbit. Two osseous stripes across the back of the tail, behind the dorsal fin, the posterior with the spine in the median line; abdominal ossifications as much developed as those on the back; there are eight in a longitudinal series nearest to the median line of the back. All the upper parts with small round blackish spots. A few small black spots on the side of the abdomen. *Fins colourless.* D. 13. A. 13. C. 10. P. 21.

? Indian Ocean.

a. Two inches long. Open sea. Presented by J. B. Godfrey, Esq.
b. Two and a half inches long: type of *Cyanichthys cæruleus* (Kaup).

The nostrils of this species do not differ from those of its congeners. Dr. Kaup states that the specimen examined by him is from New Guinea; but the source whence the example was obtained was never known at the British Museum. He has evidently transferred Gaimard's statement, which refers to another species, to this individual.

9. Chilomycterus affinis.

Spines very short, compressed, with long, strong, flat, ridged roots, the anterior root being the longest. The flat interorbital space and the forehead without spines or ossifications. Supraorbital spines very feeble; *the inner root of the foremost does not overlap the frontal bone.* Back of the tail crossed by two osseous stripes, the anterior composed of two roots of two ossifications, and the posterior being a single two-rooted ossification with a spine; abdominal ossifications as much developed as those on the back; there are eight in a longitudinal series nearest to the median line of the back. The dark coloration of the back descends on the sides in front of and behind the pectoral fin and in front of the dorsal. Two or three round black spots behind the pectoral fin; a black vertical bar below the eye. No other spots on the body; fin-rays with numerous brown dots. P. 21. D. 13. A. 12. C. 10.

Hab. —— ?

a. Stuffed, 15 inches long.

6. DICOTYLICHTHYS.

Dicotylichthys, *Kaup.*

Jaws without median suture. Body covered with dermal ossifications, each of which is provided with a spine; the anterior are two-rooted and erectile, the posterior three-rooted and immoveable. Nasal tentacle with two cylindrical and tapering branches; no nostril.

Australia; Cape of Good Hope.

This genus is very distinct from *Chilomycterus,* with which it was confounded by Dr. Bleeker.

1. Dicotylichthys punctulatus.

Dicotylichthys punctulatus, *Kaup, Wiegm. Arch.* 1855, p. 230.

Dorsal spines much shorter than those on the sides and abdomen, those in front of the pectorals erectile, those behind three-rooted. Back of the tail without ossifications; but a root of the last dorsal spine reaches across behind the dorsal fin. There are about 13 transverse series of spines between the snout and the dorsal fin. Body with small, round, scattered black spots. A black vertical bar below the eye, a second in front of and a third behind the root of the pectoral fin.

Australia; Cape of Good Hope.

a, b, c. Adult (11 inches), half-grown, and young. Sydney. Presented by G. Krefft, Esq.
d. Adult: stuffed. Cape. Presented by Sir A. Smith.—Type of the species.
e. Adult: stuffed. Mauritius? Presented by Lady F. Cole.
f–g. Adult (14 inches): stuffed.

7. ATOPOMYCTERUS.

Diodon, sp., *Kaup.*
Atopomycterus, *Bleek. Atl. Ichth. Gymnod.* p. 49.

Jaws without median suture. Body covered with dermal ossifications, each of which consists of two roots and an erectile spine. Nasal tentacle as in *Dicotylichthys.*

Australia.

This genus is so closely allied to *Dicotylichthys* that the propriety of separating it may be questioned.

1. Atopomycterus nychthemerus.

Diodon nicthemerus, *Cuv. l. c.* p. 135; ? *Jenyns, Voy. Beagle, Fish.* p. 150; *Kaup, Wiegm. Arch.* 1855, p. 228; *Bleek. Verhand. Ak. Wet. Amsterd.* ii. *Van Diemen's Land,* p. 25.

All the spines slender, rounded, without ridge. Upper part of the tail without spines. The roots of the spines are very short and feeble. There are about thirteen transverse series of spines between the snout and dorsal fin. Upper parts blackish brown; in young individuals the dark colour descends on the sides in four bands, viz.

below the eye, in front of and behind the pectoral fin, and above the vent. No other spots.

Vert. 9/12.

South Australia; Tasmania.

a. Adult ($13\frac{1}{2}$ inches): skin. South Australia.
b. Young. South Australia. Purchased of Mr. Stevens.
c. Adult: dried. Port Leschenault. Presented by W. E. Bates, Esq.
d–e. Adult (10 inches). Tasmania.
f–n. Adult, half-grown, and young: stuffed. Tasmania.
o. Adult: skeleton. Tasmania. Purchased.

8. TRICHODIODON.

Diodon, sp., *Cuv.*, *Kaup.*
Trichodiodon, *Bleek. Atl. Ichth. Gymnod.* p. 49.

Jaws without median suture. Body covered with very small dermal ossifications, each with a pair of lateral roots, and a fine, flexible spine. A nasal tentacle. Dorsal and anal fins as in the allied genera.

Atlantic.

1. Trichodiodon pilosus.

Diodon pilosus, *Mitch. Trans. Lit. & Phil. Soc. New York*, i. p. 471, pl. 6. fig. 4.
? Diodon asper, *Cuv. Mém. Mus.* iv. p. 138; *Barneville, Rev. Zool.* 1846, p. 142 (adult?).

The spines are hair-like, one-eighth of an inch long in an example $1\frac{1}{2}$ inch long. The large example in the Paris Museum ($2\frac{1}{2}$ feet long) is covered with round brown spots.

Northern Atlantic.

9. TRICHOCYCLUS.

Jaws without median suture. Body covered with long hair-like bristles. No nasal tentacle. (Dorsal and anal fins absent?)

1. Trichocyclus erinaceus.

Owing to the indifferent preservation of the specimen, I can give but an incomplete description of it. It is seven-eighths of an inch long, and the longest hairs (which are those on the sides) about three-eighths of an inch. The entire body, except the snout, is covered with such hairs. The jaws are prominent, depressed; and the upper terminates in a slight hook, overlapping the lower jaw. The caudal fin is distinct, and the pectoral a narrow fringe behind the gill-opening; but I am unable to find a trace of the dorsal and anal fins.

Habitat —— ?

a. Purchased of Mr. Leadbeater.

Third Group. MOLINA.

10. ORTHAGORISCUS.

Orthragoriscus, *Bl. Schn.* p. 510.
Cephalus, *Shaw, Gen. Zool.* v. 2. p. 432.
Cephalus, Tympanomium, Diplanchias, Trematopsis, Orthragoriscus, *et* Ozodura, *Ranzani.*
Ranzania *et* Orthagoriscus, *Nardo.*
Pedalion, *Guilding.*

Jaws without median suture. Tail extremely short, truncate; vertical fins more or less confluent. Body compressed, short, covered with a rough or tessellated skin not capable of being expanded by air. Ventral fins none. No pelvic bone. Air-bladder absent. An accessory opercular gill.

Pelagic fishes of the tropical and temperate regions.

a. ORTHAGORISCUS. *Skin rough.*

1. Orthagoriscus mola.

Sun-Fish.
Orthragoriscus s. Luna piscis, *Rondel.* p. 424; *Gesner*, p. 640.
Mola, *Salvian.* fol. 155; *Aldrov.* p. 412; *Willughby*, p. 151, tab. J 26; *Jonston*, i. tit. 1. cap. 3, tab. 9. fig. 2; *Jan. Planc. Comm. Inst. Bonon.* iii. p. 331, tab. 8; *Borlase, Cornwall*, p. 268, tab. 26. fig. 7; *Brünn. Pisc. Mass.* p. 8; *Domsma, Verh. Maatsch. Weet. Haarlem*, xii. 1770, p. 413, c. tab.; *Houttuyn, Natuurl. Hist.* i. tab. 68. fig. 7.
Ostracion, sp., *Artedi, Synon.* p. 83. no. 4; *Gen.* p. 61. no. 22; *Gronov. Zoophyl.* nos. 185 & 186.
Tetrodon mola, *L. Syst. Nat.* i. p. 412; *Retz. Vet. Ac. Nya Handl.* vi. 1785, p. 115, tab. 4; *Donovan, Brit. Fish.* ii. p. 25; *Home, Lect. Compar. Anat.* vi. pls. 50 & 51.
Short Diodon, *Penn. Brit. Zool.* iii. p. 131, pl. 19.
Short Tetrodon, *Penn. l. c.* ed. 1812, iii. p. 172, pl. 22.
Mole, *Duhamel, Pesches*, ii. sect. ix. p. 306, pl. 23.
Diodon mola, *Bl. Ausl. Fisch.* i. p. 75, t. 128.
Tetrodon lune, *Lacép.* i. p. 509.
Orthragoriscus mola, *Bl. Schn.* p. 510; *Flem. Brit. An.* p. 175; *Jenyns, Man.* p. 490; *Bellingham, Mag. Nat. Hist.* 1840, p. 235; *Schleg. Faun. Japon. Poiss.* p. 288, tab. 127; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 462, and 3rd edit. ii. p. 432; *Parn. Werner. Mem.* vii. p. 401; *Dekay, New York Faun. Fish.* p. 331, pl. 59. fig. 193; *Storer, Massach. Reports*, p. 170, pl. 3. fig. 1, and *Mem. Am. Acad.* viii. p. 420, pl. 34. fig. 2; *Bennett, Whaling Voyage*, ii. p. 262; *Kröyer, Danm. Fisk.* iii. p. 732; *Nilss. Skand. Faun. Fisk.* p. 697; *Wellenbergh, Observationes anatomicæ de O. M.* Ludg.-Batav. 1840; *Goodsir, Edinb. Philos. Journ.* xxx. p. 188; *Cleland, Nat. Hist. Review*, 1862, p. 183; *Costa, Faun. Regn. Napol. Pesc.* tav. 63 & 64.
Orthagoriscus fasciatus, *Bl. Schn.* p. 511.
Cephalus mola, *Risso, Ichth. Nice*, p. 60.
—— orthagoriscus, *Risso, Eur. Mérid.* iii. p. 173.
—— brevis, *Shaw, Gen. Zool.* v. 2, p. 432, pl. 175; *Neill, Werner. Mem.* i. p. 546; *Turt. Brit. Faun.* p. 116; *Mitch. Lit. & Phil. Trans. New York*, i. p. 471.

Ozodura orsini, *Ranzani, Nov. Comm. Ac. Sc. Inst. Bonon.* iii. 1839, p. 80.
—— ursini, *Ranzani, l. c.* tab. 6.
Tympanomium planci, *Ranzani, l. c.*
Diplanchias nasus, *Ranzani, l. c.*
Trematopsis willughbei, *Ranzani, l. c.*
Orthragoriscus retzii, ghini, rondeletii, blochii, redi, *Ranzani, l. c.*
—— lunaris, *Gronov. Syst.* ed. *Gray*, p. 165.
—— solaris, *Gronov. l. c.*
Aledon storeri *et* capensis, *Casteln. Poiss. Afr. Austr.* pp. 75, 76.
Mola nasus, *Steenstrup & Lütken, Overs. Dansk. Vid. Selsk. Forh.* 1863, p. 36.
—— retzii, *Steenstrup & Lütken, l. c.*
? Orthagoriscus, sp., *Swinhoe, Ann. & Mag. Nat. Hist.* 1863, xii. p. 225.
Sunfish, *Couch, Fish. Brit. Isl.* iv. p. 377, pl. 245.
Orthragoriscus ozodura, *Harting, Verhand. Ak. Wet. Amsterd.* 1868, pp. 1–48, pls. 1–8.

Young:—

Mola aculeata, *Kölreuter, Nov. Comm. Petropol.* x. 1766, p. 337, tab. 8. figs. 2 & 3.
Diodon mola, *Pall. Spicileg. Zool.* fasc. viii. p. 39, tab. 4. fig. 7.
Orthragoriscus hispidus, *Bl. Schn.* p. 511.
Diodon carinatus, *Mitch. Ann. Lyc. Nat. Hist. New York,* ii. p. 264, pl. 5. fig. 1.
Acanthosoma carinatum, *Dekay, New York, Faun. Fish.* p. 330, pl. 55. fig. 179.
Orthagoriscus spinosus, *Cuv. Règne An.*; *Richards. Voy. Sulph. Fish.* p. 125, pl. 62. figs. 10–12; *Gatchet, Act. Soc. Linn. Bordeaux,* v. 1832, p. 253.
Orthragoriscus aculeatus, *Ranzani, l. c.*
Pallasia, *Nardo, Ann. Sc. Regno Lombard. Venet.* x. 1840, p. 112.

These young fishes form a distinct family, *Molacanthidæ*, in Mr. Gill's system.

D. 17–18. A. 14–17. C. 12–16. P. 12–13. Vert. 10/7.

Body elevated, its depth being always considerably more than one-half of the total length; in very young examples the vertical diameter even exceeds the longitudinal. Skin rough, minutely granulated. With age a hump is developed above the mouth, topped by an osseous tubercle, which in very young examples is a spine. Dorsal and anal fins narrow, high, becoming comparatively shorter with age. A series of more or less conspicuous ossifications on the posterior edge of the caudal fin. Very young examples with scattered spines, some of which are permanent through life as osseous tubercles—for instance, at the throat. Eye much nearer to the upper profile than to the lower.

A pelagic fish, probably inhabiting most of the seas of the temperate and tropical regions.

a. Stuffed, 3½ feet long. Ireland. Presented by the Earl of Enniskillen.

b. Stuffed, 7 feet long. Portsmouth. Presented by Major Parlby and John Fox, Esq.

c. Stuffed, 2 feet long. Plymouth. Presented by Lieut. H. F. Spence, R.N.
d. Stuffed, 1½ feet long. England. Presented by W. Beatie, Esq.
e. Stuffed, 3 feet long. Adriatic. (*Ozodura orsini.*)
f. One inch long. North Atlantic. Presented by Capt. Knocker, R.N.
g–i. Stuffed, 1½ foot long.
k, *l.* One inch long.
m. Skeleton, 28 inches long.
n. Skeleton, 3 feet long. Ireland. Presented by the Earl of Enniskillen.

Prof. Steenstrup and Dr. Lütken have endeavoured to show the distinctness of *Mola retzii* and *Mola nasus.* In my opinion, the former is the younger state of the latter, as is proved by our series of examples. Especially the presence of supplementary teeth within the cutting jaws is not a constant character; these teeth are more or less regular in examples of about 18 inches, but disappear altogether when the individual has attained to a length of about three feet. The changes which the body and fins undergo with age have been indicated above.

It is now generally admitted, especially by Italian ichthyologists, that Ranzani's distribution of the Sunfishes described by his predecessors into six genera and fifteen species is an uncritical compilation. However, it is possible that the fish described by him under the name of *Orthragoriscus alexandrini*, *l. c.* tab. 6, is specifically distinct from *O. mola.* The nape is so much elevated that the eye is almost as far distant from the dorsal profile as from the ventral. The fins are lower than is generally observed in large Sunfishes. The caudal portion is unnaturally stuffed out.

Also *Orthagoriscus analis*, Ayres, Proc. Calif. Acad. Nat. Sc. ii. p. 31, fig. p. 54, from San Francisco, cannot be admitted at present as a distinct species. The dorsal and anal fins would appear to be considerably lower than in *O. mola*; but it is possible that those fins are mutilated in the single specimen known.

2. Orthagoriscus lanceolatus.

Orthagoriscus lanceolatus, *Liénard, Mag. Zool.* 1840, p. 291.

D. 24. A. 21. C. 19. P. 17.

Body oblong, covered with a rather rough skin. Caudal fin as long as deep, rounded behind, and spotted with grey. (*Liénard.*)

Mauritius.

β. Ranzania. *Skin tessellated.*

3. Orthagoriscus truncatus.

Mola, *Jan. Planc. Comm. Inst. Bonon.* ii. 2. 1766, p. 297, tab. 17.
Sun-fish from Mount's Bay, *Borlase, Cornw.* p. 268, pl. 26. fig. 7; *Couch, Fish. Brit. Isl.* iv. p. 381, pl. 246 (bad).
Oblong Diodon, *Penn. Brit. Zool.* iii. p. 113, pl. 19.
Oblong Tetrodon, *Penn. l. c.* ed. 1812, iii. p. 170, pl. 22.

Tetrodon truncatus, *Retz. Svensk. Vet. Ak. Nya Handl.* vi. 2. p. 116; *Gm. L.* i. p. 1448; *Lacép.* i. p. 514, pl. 22. fig. 2; *Donov. Brit. Fish.* ii. pl. 41.
Orthragoriscus oblongus, *Bl. Schn.* p. 511; *Jenyns, Man.* p. 491; *Yarr. Brit. Fish.* 2nd edit. ii. p. 469, or 3rd edit. ii. p. 439; *Harting, Verhand. Ak. Wet. Amsterd.* 1868, p. 12, pl. 2. fig. 2.
Cephalus oblongus, *Shaw, Gen. Zool.* v. p. 439, pl. 176; *Turt. Brit. Faun.* p. 116.
—— elongatus, *Risso, Eur. Mérid.* iii. p. 173.
Orthagoriscus truncatus, *Flem. Brit. An.* p. 175.
—— varius, *Cuv. Règne An.*; *Ranzani, l. c.*
Mola planci, *Nardo, in Férussac, Bull. Sc. Nat.* xiii. 1828, p. 437.
Cephalus cocherani, *Traill, Werner. Mem.* vi. 1832.
Orthragoriscus elegans, *Ranzani, l. c.*
—— battaræ, *Ranzani, l. c.*
Ranzania truncata, *Nardo, Ann. Sc. Regn. Lombard. Venet.* 1840, x. p. 105; *Steenstrup & Lütken, l. c.*

D. 17–19. A. 19. C. 18–22. P. 13.

The height of the body is one-half or rather less than one-half of the total length. Skin smooth, divided into small hexagonal scutella. Snout straight, the mouth being on the same level with the eye. Base of the very short caudal straight, slightly oblique.

Atlantic; Pacific.

a. Stuffed, 19 inches long. Cape Seas. From Sir A. Smith's Collection.

b. Five inches long. Sierra Leone.

Subclass II. DIPNOI.

Fishes with the skeleton partly cartilaginous, partly osseous; no occipital condyle. Bulbus arteriosus with two longitudinal valves; air-bladder double, lung-like, communicating by a duct and glottis with the hæmal side of the œsophagus, with a pulmonary vein. A narrow gill-opening on each side, with a rudimentary gill-cover; some of the branchial arches without gills; gills free, membranaceous. Nostrils double on each side. Intestine with a spiral valve. Optic nerves not decussating. Oviducts distinct. Ventral fins abdominal.

Cfr. Müller, Abhandl. Ak. Wiss. Berlin, 1844, p. 201; Owen, Anat. Vertebr. i. pp. 8, 14.

One family only—

SIRENOIDEI.

Body eel-shaped, covered with cycloid scales. Vertical fins a continuous border to the compressed tapering tail. Pectoral and ventral fins subulate. A single maxillary dental plate is opposed to a single mandibular one. Scapular arch attached to the occiput. Vent not in the median line. No pseudobranchiæ.

Freshwater fishes of tropical Africa and America.

Two genera are known:—

Three external branchial appendages	1. Protopterus, p. 322.
No external branchial appendages	2. Lepidosiren, p. 322.

1. PROTOPTERUS.

Protopterus, *Owen.*
Rhinocryptis, *Peters.*
Protomelus, *Hogg, Ann. & Mag. Nat. Hist.* 1841, vii. p. 359.

Pectoral and ventral filaments with a fringe containing rays. Upper labial cartilage with a median pair of conical teeth. The dental lamina of each jaw with some strong vertical ridges and cusps. Three small branchial appendages above the small gill-opening. Six branchial arches, with five intervening clefts.

Tropical Africa.

1. Protopterus annectens.

Lepidosiren annectens, *Owen, Proc. Linn. Soc.* 1839, p. 27, and *Trans. Linn. Soc.* 1841, xviii. p. 327; *Milne-Edwards, Ann. Sc. Nat.* 1840, xiv. p. 159; *Jardine, Ann. & Mag. Nat. Hist.* 1841, vii. p. 21; *Melville, Report Brit. Assoc.* 1847, p. 78; *Gray, Proc. Zool. Soc.* 1856, p. 342, taf. 11; *Gulliver, Proc. Zool. Soc.* 1862, p. 101 (blood-corpuscles); *Cobbold, Proc. Zool. Soc.* 1862, p. 120, taf. 13 (skull without labial cartilage); *McDonnell, Zeitschr. Wiss. Zool.* 1860, x. p. 409; *Baker, Albert Nyanza*, p. 131; *Günth. in Petherick's Travels*, ii. p. 268*.

Protopterus anguilliformis, *Owen, l. c.*; *Peters, Fisch. Mossamb.* p. 3, taf. 1. fig. 1.

Rhinocryptis amphibia, *Peters, Monatsber. Ak. Wiss. Berl.* 1844, p. 414, and *Müller's Arch. Anat.* 1845, p. 11, taf. 1–3.

Protopterus annectens *et* rhinocryptis, *Gray, Batrach. Grad.* p. 62.

—— æthiopicus, *Heckel, Sitzgsber. Ak. Wiss. Wien*, 1851, vii. p. 685.

Scales in about sixteen longitudinal series on each side of the body. About 36 pairs of ribs.

Tropical Africa.

a–b. Adult: stuffed, 34 inches long. West Africa. From the Crystal Palace Company.

c, d, e, f, g, h. Many adult and half-grown specimens. River Gambia.

i–l. Half-grown, enclosed in mud cases. Sierra Leone. Presented by Col. Hill.

m. Adult: stuffed. Nile. Purchased of M. Parzudaki.

n–o, p–q. Half-grown and young. Zanzibar. From Dr. Kirk's Collection.

r, s. Adult. Zambezi. From Dr. Kirk's Collection.

2. LEPIDOSIREN.

Lepidosiren, *Fitzinger.*
Amphibichthys, *Hogg, Ann. & Mag. Nat. Hist.* 1841, p. 362.

Pectoral and ventral filaments without fringe. Upper labial cartilage with a median pair of conical teeth. The dental lamina of each jaw with strong cusps supported by vertical ridges. No external branchial appendages. Five branchial arches, with four intervening clefts.

---

* The first discoverer of *Protopterus* in the Nile was not Sir S. Baker, as I previously believed, but Dr. Knoblecher (see Heckel, *l. c.*).

Brazil.

1. Lepidosiren paradoxa.

Lepidosiren paradoxa, *Fitz. Isis*, 1837, p. 379; *Natterer. Ann. Wien. Mus.* 1839, ii. p. 165 (with a plate); *Van der Hoeven, Tyds. Natuurl. Geschied.* iv. 1838, p. 407; *Bischoff, Ann. Sc. Nat.* 1840, xiv. pp. 116–159 (anatomy); *Heckel, Müller's Arch. Anat.* 1845, p. 534; *Hyrtl, Abhandl. Böhm. Gesellsch.* iii. 1845, pp. 605–668 (this monograph is also separately printed).

? The Minhocâo of the Goyanese, *St.-Hilaire, Compt. Rend.* 1846, xxiii. p. 1145; *Edinb. New Philos. Journ.* 1846, p. 278; *Sillim. Amer. Journ.* 1847, iv. p. 130; *Froriep's Notiz.* 1847, p. 198.

About 55 pairs of ribs.

River Amazons and tributaries.

Castelnau (Anim. Am. Sud) has made some additions to the synonymy of the Lepidosirens; he describes the American species as *L. dissimilis* (p. 104, pl. 1) and the African as *L. tobal* and *L. arnaudii* (p. 105).

CERATODUS (Agass.).

After this sheet had passed through the press, Mr. Krefft informed me of the most interesting discovery that a living representative of *Ceratodus* had been found in Queensland. Nothing of this genus was hitherto known beyond teeth, as those described and figured by Agassiz in Poiss. Foss. iii. p. 129, pls. 18–20. I am enabled, by a photograph kindly communicated by Mr. Krefft, to add the following characters:—General form of the body resembling that of *Osteoglossum*; scales large, cycloid (L. lat. 35. L. transv. 8). Vent in the posterior third of the total length. Vertical fins confluent, the dorsal commencing in the middle of the body. The paired fins long, paddle-shaped, with a central scaly axis bearing a rayed membrane above and below. Ventral fins far back. Gill-opening a narrow slit. The upper and lower jaw armed with a pair of very large six- or seven-pronged teeth. Skeleton semicartilaginous.—The teeth are extremely similar to those of *C. runcinatus* (Plien.), from the Muschelkalk, so that there cannot be any doubt as regards the generic identity of these two fishes. Unfortunately nothing is known of the internal organs; so that at present we cannot determine whether it should be referred to the *Dipnoi* or *Ganoidei*, or whether it is the type of a separate subclass. Agassiz had placed it among the Sharks. Mr. Krefft will give a short account of it in the Proc. Zool. Soc. 1870, under the name of *Ceratodus forsteri*.

Subclass III. GANOIDEI.

Fishes with the skeleton more or less ossified. Bulb of the aorta muscular, with numerous valves. Branchiæ free; gill-cavity protected by a gill-cover. Intestine with a spiral valve. Optic nerves not decussating. Ventral fins abdominal, if present.

Cfr. Müller, Abhandl. Ak. Wiss. Berlin, 1844, p. 141.

Synopsis of the Families.

I. **HOLOSTEI.** Body covered with scales; skeleton bony.	
A. *Scales cycloid*	1. **Amiidæ**, p. 324.
B. *Scales ganoid.*	
a. Fins without fulcra	2. **Polypteridæ**, p. 326.
b. Fins with fulcra	3. **Lepidosteidæ**, p. 328.
II. **CHONDROSTEI.** Skin naked, or with osseous bucklers. Skeleton partly cartilaginous.	
A. Mouth small, transverse, inferior.	1. **Acipenseridæ**, p. 332.
B. Mouth lateral, very wide	2. **Polyodontidæ**, p. 346.

Order I. HOLOSTEI.

Skeleton bony; body covered with scales.

Holostei, *Müller, Abhandl. Ak. Wiss. Berlin*, 1844, p. 147.
Lepidoganoidei (part.), *Owen, Compar. Anat. of Vertebr.* i. p. 12.

Freshwater fishes of North America and Africa.

Fam. I. AMIIDÆ.

Scales cycloid; a long soft dorsal fin. Abdominal and caudal parts of the vertebral column subequal in extent. Pseudobranchiæ none.

Fresh waters of North America.

One genus only.

1. AMIA.

Amia, *L. Syst. Nat.* i. p. 500; *Cuv. & Val.* xix. p. 402; *Vogt, Ann. Sc. Nat.* 1845, July; *Müller, Abhandl. Ak. Wiss. Berlin*, 1844, p. 204; *Franque, Amiæ calvæ Anatomia*, Berl. 1847, fol. c. tab.; *Heckel, Sitzgsber. Ak. Wiss. Wien*, 1851, vi. p. 221.

Body elongate, subcylindrical, compressed behind. Snout short, rounded; cleft of the mouth of moderate width. Jaws with an outer series of closely set pointed teeth, and with a band of rasp-like teeth; similar teeth on the vomer, palatine, and pterygoid bones. One long dorsal, a short anal, and rounded caudal fin. Ventral fins well developed. A single large gular plate; ten to twelve branchiostegals. Gills four. No pseudobranchia; air-bladder bifurcate in front, cellular, communicating with the pharynx. Stomach with a blind sac; no pyloric appendages; a rudimentary spiral valve in the rectum. No closed oviduct.

Fresh waters of the United States.

1. Amia calva.

Bow-fin; Mud-fish.

Amia calva, *L. Syst. Nat.* i. p. 500; *Schoepff, Schrift. ntrf. Freund. Berl.* viii. p. 174: *Bonnaterre, Encycl.* p. 149; *Bl. Schn.* p. 451, pl. 80; *Cuv. Règne An.*; *Kirtland, Bost. Journ. Nat. Hist.* iii. p. 479, pl. 29. fig. 1; *Dekay, New York Faun. Fish.* p. 270; *Storer, Synopsis Fish. N. Amer.* p. 212.
—— ocellicauda, *Richards. Faun. Bor.-Amer.* iii. p. 236; *Cuv. & Val.* xix. p. 423; *Girard, U. S. Pac. R.R. Exp. Fish.* p. 349.
—— occidentalis, *Dekay, l. c.* p. 269, pl. 39. f. 125; *Cuv. & Val.* xix. p. 429; *Girard, l. c.* p. 350.
—— marmorata, *Cuv. & Val.* xix. p. 412, pls. 577 & 578.
—— ornata, *Cuv. & Val.* xix. p. 420.
—— viridis, *Cuv. & Val.* xix. p. 421.
—— canina, *Cuv. & Val.* xix. p. 424.
—— lintiginosa, *Cuv. & Val.* xix. p. 426.
—— subcærulea, *Cuv. & Val.* xix. p. 427.
—— cinerea, *Cuv. & Val.* xix. p. 430.
—— reticulata, *Cuv. & Val.* xix. p. 431.

D. 47–50. A. 12. L. lat. 65–70. L. transv. 9/17.

The height of the body is rather less than the length of the head, and about one-fourth of the total (without caudal).

North America.

a, b, c–d. Adult (24 inches), half-grown, and young. North America.

e. Adult: skin. Lake Pontchartrain. Purchased of Mr. Parnell.

Fam. 2. POLYPTERIDÆ.

Müller, Abhandl. Ak. Wiss. Berl. 1844, p. 147.

Scales ganoid, lozenge-shaped; fins without fulcra. A series of dorsal spines, to which an articulated finlet is attached; anal placed close to the caudal fin, the vent being near the end of the tail. Abdominal part of the vertebral column much longer than the caudal. No pseudobranchiæ.

Fresh waters of Central and Western Africa.

Two genera are known:—

Ventral fins well developed . .	1. Polypterus, p. 326.
Ventral fins none	2. Calamoichthys, p. 327.

1. POLYPTERUS.

Polypterus, *Geoff. St.-Hilaire, Descr. Eg. Poiss.*; *Müller, Abhandl. Ak. Wiss. Berlin,* 1844, p. 149.

Body elongate, subcylindrical; snout short. Nostrils with a tentacle. Teeth rasp-like, in broad bands in the jaws, on the vomer and palatine bones; jaws with an outer series of closely set larger, pointed teeth. Fins without fulcra. A series of dorsal fins, each formed of a single spine, to which a finlet of articulated rays is attached. Caudal fin surrounding the extremity of the vertebral column. Ventral fins well developed. Maxillary simple; vomer simple; mandible composed of the same pieces as in fishes generally. Vertebræ biconcave. Three and a half gills; no opercular gill or pseudobranchia; a spiracle on each side of the parietal, covered by an osseous plate. Branchiostegals replaced by a single large bony lamina. Stomach without blind sac; one pyloric appendage; intestine with a spiral valve. Air-bladder double, communicating with the ventral wall of the pharynx.

Tropical parts of Africa.

On the osteology and anatomy see Geoffroy St.-Hilaire, Descript. de l'Egypte; Agassiz, Poiss. Foss. ii. 2. p. 32; Müller, *l. c.*

1. Polypterus bichir.

Polypterus bichir, *Geoff. Bull. Sc. Soc. Philom.* iii. p. 97, and *Descr. Eg. Poiss.* pl. 3, and *Ann. Mus.* i. p. 57, pl. 5; *Lacép.* v. p. 341; *Cuv. Règne An.*; *Guichen. Mag. Zool.* 1839, *Poiss.* p. 10; *Agass. Poiss. Foss.* ii. 2. p. 32, pl. C & C *a*.

—— senegalus, *Cuv. Règne An.*; *Guichenot, l. c.* p. 11, pl. 1.

—— endlicheri, *Heckel, in Russegger's Reise,* ii. 3. p. 310, taf. 22. fig. 1

Polypterus palmas, *Ayres, Proc. Bost. Soc. Nat. Hist.* iii. 1850, p. 181, and *Bost. Journ. Nat. Hist.* vi. 1850, p. 241, with fig.

From eight to eighteen dorsal finlets. Six or seven or eight scales in an oblique series between the lateral line and dorsal finlets.

Lat. l. 54–60. Vert. 51/16.

Central and West Africa; Nile.

α. Eighteen dorsal finlets.

a. Adult: stuffed. Cairo. From Dr. Rüppell's Collection.

β. Sixteen dorsal finlets.

b–c. Adult (32 inches): stuffed. Nile.

γ. Fifteen dorsal finlets.

d. Adult. Nile.
e. Adult: stuffed. Senegal.
f. Half-grown: stuffed. Gambia. Presented by P. Whitfield, Esq.

δ. Fourteen dorsal finlets.

g. Adult. West Africa. Purchased of Mr. Dalton.

ε. Thirteen dorsal finlets.

h. Adult. West Africa. Purchased of Mr. Dalton.
i. Half-grown. Nile. From Mr. Petherick's Collection.

ζ. Twelve dorsal finlets.

k–l. Adult and half-grown: skins. West Africa. Purchased of Mr. Dalton.
m. Adult: stuffed. Chartoum. From Mr. Petherick's Collection.

η. Nine or ten dorsal finlets.

n–p, q–t. Half-grown. Upper Nile. From Mr. Petherick's Collection.
u. Half-grown. Senegal. Purchased of Mr. Cuming.
v, w–x, y–α. Young. West Africa.
β. Young: skin. West Africa. Purchased of Mr. Dalton.

θ. Eight dorsal finlets.

γ–ε. Young. Gambia. Purchased of Mr. Dalton.
ζ. Half-grown. Sierra Leona. Purchased of Mr. Stevens.

2. CALAMOICHTHYS.

Erpetoichthys, *J. A. Smith, Proc. R. Phys. Soc. Edinb.* 1865, p. 273, and 1866, p. 331.

Calamoichthys, *J. A. Smith, Proc. R. Soc. Edinb.* v. 1865–66, p. 654, or *Ann. & Mag. Nat. Hist.* xviii. p. 112.

Distinguished from *Polypterus* by its greatly elongate form and the absence of ventral fins.

Old Calabar.

1. Calamoichthys calabaricus.

J. A. Smith, l. c., and *Trans. R. Soc. Edinb.* 1866, p. 457, pls. 31 & 32; *Traquair, Ann. & Mag. Nat. Hist.* xviii. pp. 112, 495, or *Proc. R. Soc. Edinb.* 1865–66, p. 657.

From nine to eleven dorsal finlets. Four scales in an oblique series between the lateral line and dorsal finlets. L. lat. 110. Vert. 100/10.

Old Calabar.

a–b. Purchased of Mr. Cutter.

Fam. 3. LEPIDOSTEIDÆ.

Müller, Abhandl. Ak. Wiss. Berl. 1844, p. 147.

Scales ganoid, lozenge-shaped; fins with fulcra; dorsal and anal fins composed of articulated rays only, placed far backwards, close to the caudal. Abdominal part of the vertebral column much longer than caudal. Opercular gill and pseudobranchiæ present.

Fresh waters of Central and North America, and Cuba.

One genus only.

1. LEPIDOSTEUS.

Lepidosteus, *Lacép.* v. p. 331; *Agassiz, Poiss. Foss.* ii. 2. p. 1; *Müller, Abhandl. Ak. Wiss. Berl.* 1846, p. 147.

Lepidosteus, Cylindrosteus, Atractosteus, *Girard, U. S. Pac. R. R. Exped. Fish.* p. 351.

Body elongate, subcylindrical; snout elongate, spatulate or beak-shaped; cleft of the mouth wide; upper jaw rather longer than lower; both jaws and palate armed with bands of rasp-like teeth and series of larger conical teeth. Nostrils near the extremity of the jaw. Front of the fins with fulcra. A short dorsal fin opposite to the anal and close to the caudal, the insertion of which is oblique, partly on the extremity, partly below the vertebral column. Upper jaw composed of numerous pieces; vomer double; lower jaw composed of as many pieces as in reptiles. Vertebræ convex in front, concave behind. Four free gills; an accessory opercular gill and pseudobranchia; no spiracles. Three branchiostegals. Air-bladder cellular, communicating with the pharynx. Stomach without blind sac; numerous pyloric appendages; intestine with a rudimentary spiral valve.

Fresh waters of North America; Cuba.

On the osteology and anatomy see Agassiz, Poiss. Foss. ii. 2. pp. 1 *et seqq.*; Müller, *l. c.*; Poey, Mem. Cub. i. p. 273; Van der Hoeven in Müller's Arch. f. Anat. 1841, p. 221 (air-bladder); Hyrtl, Sitzgsber. Ak. Wiss. Wien, 1852, viii. p. 71 (air-bladder); Valentin, in his Repert. Anat. & Phys. v. 1840, p. 392 (air-bladder); Hyrtl, *l. c.* p. 234 (arteries).

1. Lepidosteus viridis.

Catesby, S. Carol. ii. pl. 30.
Manjuari, *Parra*, p. 111, lam. 40. fig. 2.
Esox viridis, *Gm. L.* i. p. 1389; *Bl. Schn.* p. 393.
—— tristoechus, *Bl. Schn.* p. 395.
Lepisosteus spatula, *Lacép.* v. p. 333; *Guichen. Mag. Zool.* 1839, *Poiss.* p. 7; *Agass. Poiss. Foss.* ii. 2. p. 3.
—— ferox, (*Raf.*) *Kirtland, l. c.* p. 18, pl. 1. fig. 2; *Storer, Mem. Am. Acad.* ii. p. 466.
—— platyrhincus, *Dekay, New York Faun. Fish.* p. 273, pl. 43. fig. 137.
—— (Atractosteus) berlandieri, *Girard, U. S. Pac. R. R. Exp. Fish.* p. 353.
—— manjuari, *Poey, Mem. Cuba*, i. pp. 273, 438, pls. 28–30 (very detailed description of external and internal structure), ii. pp. 68, 415; also in *Ann. Lyc. Nat. Hist. New York*, 1855, p. 134.
Atractosteus tropicus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1863, p. 172.
Lepidosteus tropicus, *Günth. Trans. Zool. Soc.* vi. p. 490.

Snout rather broad, spatulate, the length of the cleft of the mouth being one-half or not much more than one-half of the length of the head. There are from eighteen to twenty-two scales in an oblique series ascending obliquely forward from the root of the ventral to the median line of the back. A series of stronger teeth along the palatine bone, similar to the maxillary series of strong teeth.

United States; Central America; Cuba.

a. Twenty inches long: skin. Cuba. From Mr. W. S. Macleay's Collection.
b–c. Nineteen inches long. Huamuchal. From Mr. Salvin's Collection.
d. Sixty-two inches long: stuffed. Mexico. Purchased of Mr. Warwick.
e. Fourty-four inches long: stuffed. Mexico. Purchased of Mr. Warwick.
f–g. Thirteen and sixteen inches long: stuffed. Mexico. Purchased of Mr. Warwick.
h. Fifty-one inches long: stuffed. North America.
i. Skull of a very large example (20 inches long).

2. Lepidosteus platystomus.

Lepisosteus platostomus, (*Raf.*) *Kirtland, Report on Zool. of Ohio*, p. 196, and *Bost. Journ. Nat. Hist.* iv. p. 20, pl. 1. fig. 3; *Storer, l. c.*
—— grayi, *Agass. Poiss. Foss.* ii. 2. p. 3.
Lepisosteus (Cylindrosteus) latirostris, *Girard, U. S. Pac. R. R. Exped. Fish.* p. 352.
—— (——) oculatus, *Winchell, Proc. Ac. Nat. Sc. Philad.* 1864, p. 183.

Snout rather broad, spatulate, the length of the cleft of the mouth being about one-half of the length of the head. There are seventeen scales in an oblique series ascending obliquely forward from the root of the ventral to the median line of the back. Teeth of the palatine bones equally minute.

United States.

a–c. From 2 to 3 feet long: stuffed. Louisiana.—(One is the type of *L. grayi*, Agass.)

Mr. Cope distinguishes *Cylindrosteus productus* from Texas, Proc. Ac. Nat. Sc. Philad. 1865, p. 86; it has a narrower snout than typical examples of *L. platystomus*, the frontal breadth being contained five times and a half in the upper part of the head in *C. productus*, and only four times and a half, or even less, in *L. platystomus*.

3. **Lepidosteus osseus.**

Acus maxima squamosa, *Willughby*, *Append.* p. 22.
Esox, sp., *Artedi*, *Gen.* p. 14. no. 3, and *Synon.* p. 27. no. 3.
Esox osseus, *L. Syst. Nat.* i. p. 516; *Bl.* tab. 390; *Bl. Schn.* p. 392; *Mitch. Trans. Phil. & Lit. Soc. N. York*, i. p. 444.
? Chifis, *Parra*, p. 109, lam. 40. fig. 1.
Lepisosteus gavialis, *Lacép.* v. p. 333; *Guichenot*, *Mag. Zool.* 1839, *Poiss.* p. 5.
—— oxyurus, (*Raf.*) *Kirtland*, *Report*, pp. 170, 196, and *Bost. Journ. Nat. Hist.* iv. p. 16, pl. 1. fig. 1; *Cope*, *Proc. Ac. Nat. Sc. Phil.* 1865, p. 87.
Sarchirus vittatus, *Rafinesque.*
Lepisosteus huronensis, *Richards. Faun. Bor.-Amer.* iii. p. 237; *Cope*, *l. c.* p. 86.
—— gracilis, *Agass. Poiss. Foss.* ii. 2. p. 3; *Richards. l. c.* p. 240.
—— bison, *Dekay*, *New York Faun. Fish.* p. 271, pl. 43. fig. 139.
—— semiradiatus, *Agass. Poiss. Foss.* ii. 2. p. 2, tab. A. fig. med. & B. figs. 1–14; *Müller*, *Abhandl. Ak. Wiss. Berl.* 1844, pl. 2.
—— lineatus, *Thompson*, *History of Vermont*, p. 145.
—— osseus, *Agass. Poiss. Foss.* ii. 2. p. 2, tab. A–B″; *Storer*, *Mem. Am. Acad.* ii. p. 465; *Cope*, *l. c.* p. 87.
—— leptorhynchus, *Girard*, *U. S. Pac. R.R. Exped. Fish.* p. 351.
—— crassus, *Cope*, *l. c.* p. 86.
—— otarius, *Cope*, *l. c.*
—— longirostris, *Cope*, *l. c.*

Snout narrow, much elongate. There are from twelve to fourteen scales in an oblique series ascending obliquely forward from the root of the ventral to the median line of the back. Mature examples have only one series of large teeth in the upper jaw; but in young ones (to 12 inches) there is a very complete second series along the palatine bones. Traces of this second series may be observed sometimes in examples 24 inches long; but in older specimens the palatines are armed with equally minute teeth.

North America.

a, b. Five feet long: stuffed. Louisiana. Presented by W. P. Smith, Esq.

c. Twenty-nine inches long: stuffed. Florida. From Mr. Johnstone's Collection.

d–i. From 2–4 feet long: stuffed. North America.

k. Eleven inches long: stuffed. Old Collection.—Type of *L. gracilis*, Agassiz.

l–m. Eleven and twelve inches long. North America. Presented by Dr. A. Günther.

Order II. CHONDROSTEI.

Skeleton partly cartilaginous. Skin with osseous bucklers or naked. Caudal fin heterocercal, with fulcra.

Chondrostei, *Müller, Abhandl. Ak. Wiss. Berlin*, 1844, p. 147.
Placoganoidei, *Owen, Compar. Anat. of Vertebr.* i. p. 12.

Seas and rivers of the temperate and arctic regions of the northern hemisphere.

Fam. 1. ACIPENSERIDÆ.

Acipenserini, *Müller, Abhandl. Ak. Wiss. Berlin*, 1844, p. 147.

Body elongate, subcylindrical, with five rows of osseous bucklers. Snout produced, subspatulate or conical, with the mouth at its lower surface, small, transverse, protractile, toothless. Nostrils double, in front of the eye. Four barbels in a transverse series on the lower side of the snout. Vertical fins with a single series of fulcra in front. Dorsal and anal fins approximate to the caudal, which is heterocercal. Gill-membranes confluent at the throat, and attached to the isthmus. Branchiostegals none. Gills four; two accessory gills. Air-bladder large, simple, communicating with the dorsal wall of the œsophagus. Stomach without blind sac. Pancreas divided into pyloric appendages. Rectum with a spiral valve.

Inhabitants of the seas of the temperate and arctic regions of the northern hemisphere, periodically entering rivers to propagate. Some species entirely confined to fresh water.

Two genera:—

The rows of osseous bucklers not confluent . . 1. *Acipenser*, p. 333.
The rows of osseous bucklers confluent on the tail.
2. *Scaphirhynchus*, p. 345.

1. ACIPENSER[*].

Acipenser, *Artedi.*
Huso, Sturio, Sterleta *et* Helops, *Brandt & Ratzeburg*, ii. pp. 3, 349.
Lioniscus, Acipenser, Helops, Antaceus, Sturio *et* Huso, *Fitzinger & Heckel, Ann. Wien. Mus.* i. p. 269.

The rows of osseous scutes not confluent on the tail. Spiracles present. Caudal rays surrounding the extremity of the tail.

Inhabitants of the temperate and arctic regions of the northern hemisphere, periodically entering rivers. Some species entirely confined to fresh water.

The geographical distribution of the Sturgeons is nearly identical with that of *Salmo.*

Synopsis of the Species.

The number of species has been so multiplied, and they have been founded on such trivial characters, that the critical study of the literature is a very difficult task. To select and understand such characters as may be used for specific distinction, ichthyologists ought to choose a species of which the greatest number of examples of all ages is available. Thus, for instance, on taking the common European Sturgeon, it will be found that the relative breadth of the snout, the form and number of the irregular scutes on the head, the rudimentary ossifications of the skin, are subject to great variations, individual and dependent on age. On the other hand, the number of lateral shields, considered by some naturalists (who have compiled their descriptions from the accounts given by different authors) to be variable, proves to be very constant, young immature examples having generally a few less, the hindmost on the tail not being developed.

Professor Golowatschof, who appears to have had very good opportunities of examining great numbers of Sturgeons in Southern Russia, points out some of the variable characters used for distinguishing species. He also states that hybrids are not unfrequent, especially between *A. stellatus* and *A. ruthenus*, and *A. huso* and *A. schypa* (Bull. Soc. Nat. Mosc. 1857, ii. pp. 530–545).

---

[*] 1. Acipenser lævis, *Agass. Lake Super.* p. 267.—Long description of the head of a Sturgeon from Lake Superior, 4½ feet long.
2. —— schypa (? *Güldenst. Nov. Comm. Petrop.* xvi. p. 533), *Brandt & Ratzeburg*, ii. p. 20, tab. 1. fig. 3 (not p. 350, tab. 1 *a*. fig. 2).—River Irtish.—Lat. scut. 40–45, dorsal 14.
3. —— dauricus, *Georgi, Bemerk. Reise Russ. Reich.* i. p. 352; *Brandt & Ratzeb. Medic. Zool.* ii. p. 12; Acipenser orientalis, *Pallas, Zoogr. Ross.-As.* iii. p. 107.—River Amur.—Lat. shields 38–40, dorsal 14–16. —The account given by *Fitzinger & Heckel* (*Ann. Wien. Mus.* i. p. 318) is a compilation of descriptions given by various authors, in which evidently several species are confounded. These two authors state, for instance, that the number of lateral shields varies between 38 and 65!
4. —— (Antaceus) caryi, *Duméril, Nouv. Arch. Mus.* 1867, p. 169, pl. 12. fig. 2.—California.
5. —— (——) putnami, *Duméril, l. c.* p. 178, pl. 13. fig. 1.—California.
6. —— dabryanus, *Duméril, Nouv. Arch. Mus.* iv. p. 98, pl. 22. fig. 1.—Yangtzekiang.
7. —— sturioides, *Malm, Forhandl. Skand. Ntrf.* 8^{de} möde, Kjöbnh. 1860, p. 618.—River Gota.—Dorsal plates 11, lateral 38.—This species is certainly distinct from *A. sturio*, but has not been properly distinguished from other European and American species. See p. 339.

The species have been referred to several subgenera, some of which were characterized by the form of the keel on the dorsal shields. In some the highest point of the keel is at its extremity (*Opisthocentres*), in others before the extremity, nearer to its middle (*Mésocentres*). It is true that certain species are "Opisthocentres" throughout life; but a number of others which are "Mésocentres" in mature age are "Opisthocentres" when young, and it is therefore better to distinguish the former by a more reliable character, namely, by the increased number of lateral shields.

Although only a few of the species recently distinguished by Aug. Duméril are admitted here as such, I am afraid several of them will prove to be merely nominal species also.

Lat. shields 60–70. Snout pointed, narrow . . 1. *ruthenus*, p. 335.

Lat. shields 60. Snout rather short, rounded; the halves of the lower lip contiguous . . . . 2. *glaber*, p. 335.

Lat. shields 49–51. Snout rather pointed; the halves of the lower lip separated by an interspace . . . . 3. *brandtii*, p. 336.

Lat shields 42–47. Snout with small osseous scutes; parietal and temporal plates subequal in size . . . . 4. *transmontanus*, p. 336.

Lat. shields 40–42. Snout with small osseous scutes; parietal plates conspicuously larger than the temporal; the first caudal fulcrum very small . . . . 5. *naccarii*, p. 336.

Lat. shields 36. The first upper caudal fulcrum much larger than the following . . . . 6. *brachyrhynchus*, p. 337.

Lat. shields 41. Snout with a large osseous shield above. 7. *nasus*, p. 337.

Lat. shields 40–45. Snout without osseous scutes above. 8. *huso*, p. 337.

Lat. shields 40–41, dorsal 17. Skin entirely naked. 9. *sinensis*, p. 338.

Lat. shields 34–35, none along the abdomen. 10. *rubicundus*, p. 338.

Lat. shields 33–38. Snout pointed, nearly one-half of the head *. 11. *maculosus*, p. 339.

Lat. shields 30–35. Snout very long and narrow, nearly two-thirds of the head . . . . 12. *stellatus*, p. 340.

Lat. shields 29–32. Snout short, obtuse, about one-third of the head. Shields coarsely radiated . . . . 13. *güldenstädtii*, p. 340.

Lat. shields 33. Snout rather short and pointed. Shields finely sculptured and rather smooth . . . . 14. *liopeltis*, p. 341.

Lat. shields 22–28. Snout very short and obtuse, about one-fourth of the head. Shields finely radiated . . . . 15. *brevirostris*, p. 341.

Lat. shields 28, dorsal 11. Anal entirely behind the dorsal. 16. *mediorostris*, p. 342.

Lat. shields 26–31, dorsal 11–13. Snout pointed, about one-half of the head . . . . 17. *sturio*, p. 342.

Lat. shields 28–29, dorsal 9. Snout one-half of the head. 18. *agassizii*, p. 344.

Lat. shields 27–29, dorsal 9–11. Snout longer than the remaining part of the head . . . . 19. *acutirostris*, p. 344.

---

* Measured to the end of the operculum.

1. Acipenser ruthenus.

Sterlet.
Marsil. Danub. Pannon. Mys. iv. p. 35, tab. 11. fig. 2 (adult), and fig. 1 (young).
Acipenser, nos. 3 & 4, *Klein, Pisc. Miss.* iv. p. 13, tab. 1.
Acipenser ruthenus, *L. Syst. Nat.* i. p. 403; *Bl. Fisch. Deutschl.* iii. p. 98, tab. 89; *Bl. Schn.* p. 347; *Lacép.* i. p. 435; *Lepechin, Reise Russ. Reich.* i. p. 154, taf. 9. figs. 1 & 2; *Brandt & Ratzeburg*, ii. pp. 21, 353, taf. 2. fig. 2; *Lovetzky, Nouv. Mém. Soc. Nat. Mosc.* iii. p. 261, tab. 18. fig. 2; *Fitzinger und Heckel, Ann. Wien. Mus.* i. p. 279, tab. 26. fig. 5, tab. 30. figs. 15 & 16; *Brandt, Bull. Ac. Sc. St. Pétersb.* x. 1851, p. 13, with a plate (albino); *Heckel & Kner*, p. 337; *Siebold, Süsswasserfische*, p. 360.
—— sterleta, *Güldenstädt, Nov. Comm. Petrop.* xvi. p. 533.
Kostera, *Gmel. Reise Russ. Reich.* iii. pp. 238, 239.
Acipenser pygmæus, *Pall. Zoogr. Ross.-As.* iii. p. 102, tab. 16.
—— kamensis, *Lovetzky, l. c.* p. 262, tab. 16. fig. 2.
? Acipenser rutheno affinis, *Pall. l. c.* p. 107.
? Acipenser aleutensis, *Fitz. & Heckel, l. c.* p. 285.
Acipenser gmelini, *Fitz. & Heck. l. c.* p. 276, tab. 25. fig. 2, tab. 30. figs. 17 & 18; *Heck. & Kner*, p. 340.
Anatomy: *Kölreuter, Nov. Comm. Petrop.* xvi. p. 511, tab. 14. figs. 1–5, xvii. p. 521, tab. 10. figs. 1–11; *Brandt & Ratzeburg, l. c.*; *Agassiz, Poiss. Foss.* ii. 2. p. 277, tab. E (skeleton); *Molin, Sitzgsber. Ak. Wiss. Wien*, 1851, p. 357 (skeleton).

Snout pointed, narrow, more or less produced, sometimes more, sometimes less than half as long as the head; barbels slightly fringed. Dorsal shields moderately developed, 11–14; lateral shields small, 60–70. Skin densely covered with minute denticulated ossifications of equal size.

Black Sea, Sea of Azow, Caspian Sea, with their rivers; rivers of Asiatic Russia; probably north-western coasts of America.

a. Stuffed, 21 inches long. Russia.
b. Several examples, 12 inches long. Wolga.
c. Twelve inches long. Danube. Presented by Prof. v. Siebold.
d. Young. Purchased.

Var. *gmelini*.

e. Twelve inches long. Wolga. Purchased of Hr. Brandt.

In the example mentioned last, the snout is so short as to be equal in length to the postorbital part of the head only, whilst it is fully three-fifths of the length of the head in some of the other examples. Others are intermediate between these extreme forms, not leaving any doubt as to *A. gmelini* being a merely nominal species.

2. Acipenser glaber.

Huso II., or Antaceus glaber, *Marsil. Danub. Pannon. Mys.* iv. tab. 10.
Acipenser glaber, *Fitzinger, Prodr. Faun. Oesterr.* p. 340; *Fitz. & Heck. Ann. Wien. Mus.* i. p. 270, tab. 25. fig. 3, tab. 28. figs. 5 & 6; *Heck. & Kner, Süsswasserf.* p. 332; *Siebold, Süsswasserf.* p. 359.

Acipenser nudiventris, *Lovetzky, Nov. Mag. Jestvenn.* ii. no. 1, and *Nouv. Mém. Soc. Nat. Mosc.* iii. p. 260, tab. 15. fig. 2.
—— marsiglii, *Brandt & Ratzeb.* ii. p. 352.
—— schipa, *Lovetzky, l. c.* p. 260, tab. 17. figs. 3 & 4 (young).

Snout rather short, rounded; both halves of the lower lip contiguous; barbels slightly fringed. Dorsal shields well developed, 12–16; lateral shields small, numerous, 60. Skin densely covered with small denticulated ossifications. D. 43.

Black Sea and Sea of Azow, with their rivers.

3. Acipenser brandtii.

Acipenser schypa, *Brandt & Ratzeb.* ii. p. 350, tab. 1*a*. fig. 2, F–K (not p. 20, tab. 1. fig. 3).

Snout rather pointed, the barbels, which are simple, being nearer to the mouth than to the extremity of the snout; the halves of the lower lip separated by an interspace. Dorsal shields rather small, 13; lateral shields small, 49–51. The upper part of the snout with small, not contiguous, shields. Skin with numerous very small denticulated ossifications. (*B. & R.*)

Black and Caspian Seas, with their rivers.

Golowatschof believes that this is a hybrid between *A. huso* and *A. schypa* (Bull. Soc. Nat. Mosc. 1857, ii. p. 541).

4. Acipenser transmontanus.

Acipenser transmontanus, *Richards. Faun. Bor.-Amer.* iii. p. 278, pl. 97.

Snout osseous above, pointed, of moderate length, much shorter than the remaining part of the head. Barbels not flattened, much nearer to the end of the snout than to the mouth. The halves of the lower lip separated by a wide interspace. The parietal and temporal plates subequal in size. Dorsal shields 12–14, lateral 42–47, small. Skin studded with small, scattered, stellated tubercles of various forms and sizes. The greater part of the anal below the dorsal. D. 45–52.

Columbia River; California.

a–b. Seventeen and thirteen inches long. California. From the Godeffroy Museum.

5. Acipenser naccarii.

Acipenser huso, *Naccari, Itt. Adr.* p. 23; *Nardo, Prodr. Adr. Ichth.* sp. 36.
—— naccarii, *Bonap. Faun. Ital. Pesc.* c. fig.; *Heckel, Sitzgsber. Ak. Wiss. Wien*, vii. 1851, p. 555, taf. 24. fig. 1; *Heckel & Kner, Süsswasserfische*, p. 353.
—— nardoi, *Heckel, l. c.* p. 557, fig. 2; *Heckel & Kner, l. c.* p. 355.

Snout osseous above, rather obtuse, of moderate length, its length being more than one-third of the length of the head. Barbels not flattened, simple, rather long, nearer to the extremity of the snout than to the eye. Parietal plates conspicuously larger than temporal. Osseous shields moderately developed, 12–14 on the back, and 40–42 along the side. Skin densely covered with numerous larger and smaller stellate ossifications. Length of the dorsal fin conspicuously more than its distance from the caudal, with 42–48 rays. The greater part of the anal below the dorsal. *The first caudal fulcrum very small.*

Adriatic.

a. Stuffed, 3 feet long. Purchased of Dr. J. Heckel.

6. Acipenser brachyrhynchus.

Acipenser brachyrhynchus, *Ayres, Proc. Cal. Acad. Nat. Sc.* 1854, p. 16.
—— (Antaceus) brachyrhynchus, *Duméril, Nouv. Arch. Mus.* iii. p. 166, pl. 11. fig. 1.
—— (——) ayresii, *Duméril, l. c.* p. 171, pl. 12. fig. 1, and pl. 16. fig. 3.

Very closely allied to *A. naccarii*. Snout osseous above, rather obtuse and short, its length being about one-third of the length of the head. Barbels not flattened, simple, rather long, nearer to the extremity of the snout than to the eye. Osseous shields moderately developed, 11–12 on the back, and 36 along the side. Skin densely covered with numerous large and smaller stellate ossifications. Length of the dorsal fin conspicuously more than its distance from the caudal fin, with 42 rays. The greater part of the anal below the dorsal. *The first upper caudal fulcrum large, much larger than the following.*

California.

a. Two feet long. Sán Francisco. Presented by Dr. W. O. Ayres as *A. brachyrhynchus*.
b–d. In bad state. San Francisco. Presented by Dr. W. O. Ayres.
e. Four feet long: stuffed. California. Presented by J. H. Gurney, Esq.

7. Acipenser nasus.

Heckel, Sitzgsber. Ak. Wiss. Wien, 1851, vii. p. 552, taf. 23; *Heck. & Kner, Süsswasserf.* p. 360.

Snout with a large osseous shield above, pointed, rather produced, equal in length to the postorbital part of the head. Barbles simple, nearer to the eye than to the extremity of the snout. Osseous shields well developed, 13 on the back, and 41 along the side. Skin with numerous rough stellate ossifications unequal in size; the ossifications of the front part of the abdomen are arranged like ganoid scales. Part of the anal fin below the dorsal. D. 41. (*Heckel.*)

Known, apparently, from a single example, 26 inches long, from Venice.

8. Acipenser huso.

Hausen.
? Ichthyocolla, *Bellon. De Aquat.* i. p. 104; *Rondel. De Pisc. fluv.*

p. 177; *Gesner, Aquat.* p. 57; *Aldrov.* p. 566; *Jonston, Pisc.* tab. 25. fig. 4; *Willughby*, p. 244.
Huso, *Albert. Magn. De Anim.* lib. xxiv.; *Gesner, Aquat.* p. 59; *Aldrov.* p. 534; *Willughby*, p. 243, tab. P 7. fig. 1; *Jonston, Pisc.* p. 116, tab. 25. fig. 13; *Marsil. Danub. Pan. Mys.* iv. p. 31, tab. 10. fig. 1.
Antaceus borysthenis, *Rondel. De Pisc. fluv.* p. 187; *Gesner, Aquat.* p. 56; *Aldrov.* p. 564.
Acipenser, sp., *Artedi, Syn.* p. 92. no. 2; *Gen.* p. 65. no. 2; *Klein, Pisc. Miss.* iv. p. 14.
—— huso, *L. Syst. Nat.* xii. p. 404; *Güldenst. Nov. Comm. Petrop.* xvi. p. 532; *Lepechin, Reise im Russ. Reich.* i. p. 158, tab. 11. figs. 1 & 2; *Bl.* i. p. 70, tab. 129; *Bl. Schn.* p. 348; *Lacép.* i. p. 422; *Pallas, Reise*, i. p. 131, ii. p. 339; *Zoogr. Ross.-As.* iii. p. 86, tab. 13; *Meidinger*, tab. 49; *Brandt & Ratzeb.* ii. p. 3, taf. 1. fig. 1, taf. 1*a*. fig. 1; *Loretzky, Nouv. Mém. Soc. Nat. Mosc.* iii. p. 258, tab. 15. fig. 1; *Fitz. & Heck. Ann. Wien. Mus.* i. p. 320, tab. 27. fig. 7, tab. 28. figs. 1 & 2; *Heck. & Kner*, p. 365.
Beluga, *Gmel. Reise Russ.* iii. p. 240.
Acipenser beluga, *Forst. Phil. Trans.* lvii. p. 532.

Snout without osseous shields above, pointed, of moderate length, much shorter than the remaining part of the head. Barbels flattened. nearer to the eye than to the end of the snout. Parietal plates much smaller than temporals. Dorsal shields 12–13 (–15), lateral 40–45 (–60?), very small. Skin with very small rough points. D. 14/49.

Black Sea and Sea of Azow, with their rivers. Occasionally in the Mediterranean.

9. Acipenser sinensis.

Acipenser sinensis, *Gray, Ill. Ind. Zool.* c. fig., & *Proc. Zool. Soc.* 1834, p. 122.
?? Acipenser mantschuricus, *Basil. Nouv. Mém. Soc. Nat. Mosc.* x. 1855, p. 250.

Snout pointed, long, its length being considerably more than that of the remaining part of the head (in an example 12½ inches long). Barbels short and thin, much nearer to the eye than to the extremity of the snout. Osseous shields well developed, 17 along the back, and 40–41 along the side. *Skin entirely naked.* A vertical line of minute ossifications between præoperculum and operculum. About one-half of the anal fin is below the dorsal. D. 50.

China.

a, *b*. Types of the species. Presented by J. R. Reeves, Esq.

10. Acipenser rubicundus.

Lesueur, Trans. Am. Phil. Soc. i. 1818, p. 388, pl. 12 (cop. by *Dekay, New York Faun. Fish.* p. 344, pl. 58. fig. 191); *Richards. Faun. Bor.-Amer.* iii. p. 284; *Fitz. & Heck. Ann. Wien. Mus.* i. p. 316.

Snout short, somewhat roundish, much shorter than the remaining portion of the head. Barbels nearer to the extremity of the snout than to the eye. Osseous shields very small; 9–12 on the back, distant from one another; 34–35 along the side, also distant;

none on the abdomen (?). Skin marked throughout with small groups of spines. The greater part of the anal below the dorsal. D. 40. (*Lesueur.*)

Great lakes of North America.

The specimen described was 4 feet long.

11. Acipenser maculosus.

Acipenser maculosus, *Lesueur, Trans. Am. Phil. Soc.* new ser. i. p. 393; *Fitz. & Heck. Ann. Wien. Mus.* i. p. 285; *Kirtland, Bost. Journ. Nat. Hist.* iv. p. 303, pl. 14. fig. 1.

—— rupertianus, *Richards. Faun. Bor.-Amer.* iii. p. 311, pl. 97. fig. 1.

—— carbonarius, *Agassiz, Lake Super.* p. 271, pl. 5.

—— rhynchæus, *Agassiz, l. c.* p. 276.

—— thompsoni (specimen of Free-Kirk College Museum), *Richards. in Yarr. Brit. Fish.* 3rd edit. ii. p. 456 *.

—— (Huso) maculosus, *Duméril, Nouv. Arch. Mus.* iii. p. 159 (name only).

—— (——) rupertianus, *Duméril, l. c.* (name only).

—— (Antaceus) cincinnati, *Duméril, l. c.* p. 174, pl. 14. fig. 2.

—— (——) buffalo, *Duméril, l. c.* p. 175, pl. 14. fig. 1.

Snout with small osseous plates above, pointed, produced, its length being equal to, or not much shorter than, the remaining part of the head, in examples to three feet long; it is somewhat longer in very young examples. Barbels nearer to the eye than to the extremity of the snout. Osseous shields well developed, 13–16 along the back, and 33–38 along the side. Skin rough, sometimes simply prickly, sometimes with more or less numerous irregularly scattered larger stellate ossifications, sometimes with those ossifications scale-like and arranged in more or less regular series. The greater part of the anal fin is below the dorsal. D. 37–45. Body generally with some irregular blackish spots.

Coasts and rivers of Arctic and Eastern North America; ? Scotland.

a. Twenty-three inches long: stuffed. Gulf of Florida.—Skin prickly, with scarcely any stellate ossifications; dorsal shields 13, lateral 34–36, those on the tail large, deeper than long (this would be a species of *Huso* according to Duméril).

b. Three feet long: stuffed. Ohio. Purchased of Mr. Parnell.—Skin with numerous irregularly scattered stellate ossifications; dorsal shields 14, lateral 38, those on the tail small, deeper than long (this would be a new species of *Antaceus* according to Duméril).

c. Twenty inches long. Montreal. Purchased of Mr. Wright.—Stellate ossifications scale-like, and arranged in oblique series; dorsal shields 15, lateral 36, those on the tail rather small, deeper than long (this would be a species of *Acipenser* according to Duméril).

---

* Through the kindness of Dr. Duns, of the New College, Edinburgh, I have been enabled to examine this example, and to convince myself that it belongs to this American species. Dr. Duns has the very strongest impression that the specimen was obtained from the Firth of Tay. In this case *A. maculosus* would occasionally occur in Europe; and *A. sturioides* may be the same fish (see p. 333).

d. Twenty-six and a half inches long: stuffed. Albany River. Presented by Sir J. Richardson.—Type of *A. rupertianus.*—Skin with numerous scattered stellate ossifications; dorsal shields 14, lateral 34, the posterior small, longer than high (this has been referred to *Huso* by Duméril, but ought to have been referred to *Antaceus*, having very distinct and numerous stellate ossifications).

12. Acipenser stellatus.

Marsil. Danub. Pann. Mys. iv. p. 37, tab. 12. fig. 2.
Acipenser seuruga, *Güldenstädt, Nov. Comm. Petrop.* xvi. p. 533.
Sewrjuga, *Lepechin, Reise Russ. Reich.* i. p. 156, taf. 10. figs. 1 & 2.
Acipenser stellatus, *Pall. Reise*, i. p. 131 (and *Anhang*), p. 460; *L. Gm.* i. p. 1486; *Bl. Schn.* p. 348; *Lacép.* i. p. 439; *Lepechin, Nov. Act. Ac. Petrop.* ix. p. 35, tab. A; *Brandt & Ratzeburg*, ii. pp. 25, 351, 352, taf. 3. fig. 3; *Lovetzky, Nouv. Mém. Soc. Nat. Mosc.* iii. p. 262, taf. 18. figs. 1, 1*a*; *Fitz. & Heckel, Ann. Wien. Mus.* i. p. 287, tab. 26. fig. 6, tab. 30. figs. 13 & 14; *Heckel und Kner*, p. 343; *Siebold, Süsswasserfische*, p. 362.
—— helops, *Pall. Zoogr. Ross.-As.* iii. p. 97.
—— donensis, *Lovetzky, l. c.* p. 263, tab. 19. fig. 1.
—— ratzeburgii, *Brandt & Ratzeburg*, ii. p. 351, taf. 1*a*. fig. 3.

Snout very long and narrow, nearly two-thirds of the length of the head. Barbels simple. Dorsal shields well developed, their keels terminating in an elevated acute point, which, however, is not the hindmost part of the shield; they are 12–15 in number; lateral shields small, 30–35. Skin with numerous smaller and larger stellate ossifications irregularly distributed. The greater part of the anal fin is below the dorsal. D. 46–51.

Black Sea and Sea of Azow, with their rivers.

a. Stuffed, 5 feet long. Russia.
b. Young. Black Sea. From Mr. Millingen's Collection.

13. Acipenser güldenstädtii.

Antaceus stellaris, *Gesner, Paralip.* p. 1262, c. fig.; *Jonston*, tab. 28. fig. 2 (cop. *Gesner*); *Willughby*, tab. P 7. fig. 4 (cop. *Gesner*); *Marsil. Danub. Pann. Mys.* iv. p. 37, tab. 12.
? Sewruga, *Gmel. Reise*, i. p. 142.
Acipenser sturio, *Güldenstädt, Nov. Comm. Petrop.* xvi. p. 532; *Pallas, Zoogr. Ross.-As.* iii. p. 91 (part.).
—— pygmæus, *Reisinger, Pisc. Hung.* p. 93 (young).
—— aculeatus, *Lovetzky, Nouv. Mém. Soc. Nat. Mosc.* iii. p. 262, tab. 19. fig. 2 (young).
—— güldenstædtii, *Brandt & Ratzeburg*, ii. pp. 13, 253, 254, tab. 3. fig. 2; *Lovetzky, l. c.* p. 259, tab. 17. figs. 1 & 2 (*A. sturio*); *Fitz. & Heck. Ann. Wien. Mus.* i. p. 297, tab. 27. fig. 9, tab. 29. figs. 7 & 8; *Heckel & Kner, Süsswasserfische*, p. 349, with figs.
—— schypa, *Fitz. & Heck. l. c.* p. 293, tab. 25. fig. 1, tab. 29. figs. 9 & 10; *Heckel & Kner, Süsswasserfische*, p. 346, with figs.

Snout short and obtuse, about one-third of the length of the head;

barbels short, simple. Osseous shields small and distant from one another, deeply sculptured and coarsely radiated, 10–12 on the back, 29–32 on the sides, and about 8 along the abdomen. Skin with numerous scattered, irregular, stellate ossifications and smaller prickles. The greater part of the anal below the dorsal. D. 35.

Rivers of the Russian Empire. Danube.

a. Stuffed, 6 feet long. Russia. Purchased of Mr. Warwick.

Acipenser heckelii, Fitz. & Heck. Ann. Wien. Mus. i. p. 303, taf. 26. fig. 4, and taf. 29. figs. 11 & 12 (or Heckel, Sitzgsber. Ak. Wiss. Wien, 1851, vii. p. 560, taf. 24. fig. 3; or Heck. & Kner, Süsswasserf. p. 357), from the Adriatic, does not appear to be a distinct species. It has been distinguished from *A. güldenstädtii* on account of its somewhat shorter and more rounded snout; the shields are less coarsely sculptured; and the stellate ossifications are of a more uniformly small size. Golowatschof also believes it to be identical with *A. güldenstädtii* (Bull. Soc. Nat. Mosc. 1857, ii. p. 542).

14. Acipenser liopeltis.

Snout rather short and pointed, its length being contained twice and two-thirds in that of the head; it is covered above and on the sides with numerous small, dense scutes. Barbels long, simple, nearer to the end of the snout than to the eye. Osseous shields of moderate size, distant, finely sculptured, rather smooth; 12 on the back, 33 on the side, and 9 along the abdomen, the latter being very narrow. Skin with numerous minute prickles and larger stellate ossifications. A curved series of small scutes crosses the cheek vertically. The greater part of the anal below the dorsal. Dorsal fin as high as long, with 36 rays. The first upper caudal fulcrum small. Dark brown.

Mississippi.

a. Stuffed, 44 inches long.

15. Acipenser brevirostris.

Acipenser brevirostrum, *Lesueur, Trans. Am. Phil. Soc.* i. p. 390; *Brandt & Ratzeburg, Med. Zool.* ii. p. 13, taf. 1. fig. 2; *Fitz. & Heck. Ann. Wien. Mus.* i. p. 313; *Dekay, New York Faun. Fish.* p. 345.

—— obtusirostris, *Lovetzky, Nouv. Mém. Soc. Nat. Mosc.* iii. p. 257.

Snout very short and obtuse, about one-fourth of the length of the head; barbels short, simple. Osseous shields rather small and distant from one another, finely radiated and granulated; 8–10 on the back, 22–28 on the sides, 6–8 along the abdomen. Skin very sparingly covered with minute prickles and very small scattered stellate ossifications. The greater part of the anal below the dorsal. D. 30.

Atlantic coasts of the United States.

a. Stuffed, 31 inches long. Presented by E. Doubleday, Esq.

16. Acipenser mediorostris.

Ayres, Proc. Calif. Ac. Nat. Sc. i. p. 15; *Duméril, Nouv. Arch. Mus.* 1867, p. 167, pl. 13. fig. 2[*].

Snout rather produced, about two-fifths of the length of the head; barbels short, simple. Osseous shields well developed; 11 on the back, 28 on the side, and about 10 along the abdomen. Skin with numerous stellate ossifications, unequal in size. *Anal fin entirely behind the dorsal.* D. 36.

California.

17. Acipenser sturio.

Sturgeon; Stör; Esturgeon.

a. *Synonymy of examples of the Old World.*

? 'Ονίσκος, *Aristot. Hist. Anim.*; *Athen.* lib. viii.

? Attilus, *Plin. Hist. Nat.* ix. c. 17; *Rondel.* p. 173; *Bellon. De Aquat.* p. 102; *Willughby*, p. 241, tab. P 7. fig. 2; *Aldrov.* v. p. 363; *Jonston*, tab. 28. fig. 4.

Sturio, *Salvian.* fol. 113, tab. 112; *Willughby*, p. 239, tab. P 7. fig. 3; *Rondelet.* p. 410; *Gesner, Aquat.* p. 73; *Jonston*, tab. 23. fig. 8.

Acipenser verus, *Aldrovand.* iv. p. 527.

Acipenser, sp., *Artedi, Syn.* p. 91. no. 1, and *Gen.* p. 65. no. 1; *Gronov. Mus.* i. p. 60. no. 131, and *Zoophyl.* p. 39. no. 140.

Seba, iii. p. 101, tab. 29. fig. 19.

Acipenser sturio, *L. Syst. Nat.* i. p. 103; *Bl. Fisch. Deutschl.* iii. p. 89, tab. 88; *Bl. Schn.* p. 347; *Risso, Ichth. Nice*, p. 56, and *Eur. Mérid.* iii. p. 166; *Lacép.* i. p. 411; *Pennant, Brit. Zool.* iii. p. 164, pl. 22; *Donovan, Brit. Fish.* pl. 55; *Nardo, Prodr. Adr. Ichth.* p. 10; *Faber, Fische Islands*, p. 46; *Ekström, Fisch. Mörkö*, p. 118; *Brandt & Ratzeb.* ii. pp. 17, 352, tab. 3. fig. 1; *Fitz. & Heckel, Ann. Wien. Mus.* i. p. 307, tab. 27. fig. 8, tab. 28. figs. 3 & 4; *Bonap. Faun. Ital. Pesc.* c. fig.; *Parnell, Fish. Firth of Forth*, p. 243; *Jenyns, Man.* p. 493; *Yarrell, Brit. Fish.* ii. p. 475, or 3rd edit. ii. p. 442; *Nilsson, Skand. Faun. Fisk.* p. 699; *Kröyer, Skand. Fisk.* iii. p. 747; *Heckel & Kner, Süsswasserfische*, p. 362, with figs.; *Sélys-Longchamps, Faune Belge*, p. 185; *Siebold, Süsswasserfische*, p. 363; *Blanchard, Poiss. France*, p. 505.

Sturgeon, *Pennant, Brit. Zool.* iii. p. 124, tab. 19; *Couch, Fish. Brit. Isl.* i. p. 157, pl. 35 (bad).

Esturgeon, *Duhamel, Pêches*, iii. p. 221, pl. 1.

Acipenser lichtensteinii, *Bl. Schn.* p. 348, tab. 69; *Brandt & Ratzeb.* ii. p. 21, tab. 2. fig. 1 (young)

—— latirostris, *Parnell, Fish. Firth of Forth*, p. 245, pl. 39 (head); or *Trans. R. Soc. Edinb.* xiv. pl. 4 (copied in *Yarrell, Brit. Fish.* 3rd edit. ii. p. 460).

—— thompsoni, *Ball, in Thompson, Nat. Hist. Ireland*, iv. p. 245.

—— hospitus, *Kröyer, Skand. Fisk.* iii. p. 780.

—— yarrellii, *Duméril, Nouv. Arch. Mus.* iii. p. 164.

Anatomy: *Rosenthal, Ichthyot. Taf.* tab. 24; *Monro, Bau d. Fisch.* tab. 8; *Bär, in Meckel's Arch.* 1826, p. 363; *Brandt & Ratzeb. l. c.*

---

[*] The length of the snout is contained twice and one-third in the entire figure of the fish, and twice and two-thirds in that of the head!

β. Synonymy of examples of the New World.

Acipenser oxyrhynchus, *Mitch. Trans. Lit. & Phil. Soc. N. York*, i. p. 462; *Lesueur, Trans. Am. Phil. Soc.* new ser. i. p. 394; *Dekay, New York Faun. Fish.* p. 346, pl. 58. fig. 189; *Ayres, Bost. Journ. Nat. Hist.* iv. p. 287; *Storer, Mem. Am. Acad.* ii. p. 499, and viii. p. 431 (pl. 35. fig. 4); *Fitz. & Heck. Ann. Wien. Mus.* i. p. 286.

Huso oxyrhynchus, *Duméril, Nouv. Arch. Mus.* iii. p. 159 (name only).

? Acipenser (Antaceus) hallowellii, *Duméril, l. c.* p. 172 (probably an old example).

Acipenser (Antaceus) lecontei, *Dumeril, l. c.* p. 177, pl. 16. fig. 1.

Snout pointed, produced, it being equal to, or but little shorter than, the remaining part of the head in examples to 3 feet long. Barbels nearer to the eye than to the extremity of the snout; in very large examples, especially those with a broad snout, the barbels are midway between snout and eye, or even nearer to the end of the snout. Osseous shields well developed: 11–13 along the back, and (34) 29–31 (in young examples sometimes 26 or 27) along the side* Skin with very small rough points in very young examples †; in older ones these ossifications are broader, rough, substellate, and more ‡ or less § regularly arranged in oblique series. Anal fin below dorsal. D. 37–44.

Mediterranean; Western and Northern Europe; Eastern North America.

a. European examples.

a. Stuffed, 8 feet long. German Ocean.—Back and abdomen with rough, rather irregular, stellate or scale-like ossifications.

b. Skin of a large example, with stellate ossifications, irregular in arrangement and size, on the back and abdomen.

c, d–g. Heads of large examples, in spirits. German Ocean.

h. Very large head, 19 inches long (*A. latirostris*).

i. Upper part of a very large head, 20 inches long (*A. latirostris*). Berwick-upon-Tweed.

k. Stuffed, 6 feet long. Thames. Purchased of the Zoological So-

---

* Whilst, according to my observations, the rudimentary ossifications of the integuments are subject to much variation with regard to development and arrangement in this and in other species, the numbers of the dorsal and lateral bucklers are very constant. I give here the numbers of seventeen European examples:—

Adult and half-grown.	Young.
13 + 34 (Black Sea)	12 + 31
12 + 31	12 + 30
12 + 31	13 + 29
11 + 31	12 + 29
11 + 31	10 + 28
13 + 30 (Black Sea)	12 + 27
13 + 29	12 + 26
13 + 29	11 + 27
	11 + 27

In American examples I count 11–12+27–29.

† *Huso*, Duméril. ‡ *Acipenser*, Duméril. § *Antaceus*, Duméril.

ciety.—Back covered with stellate ossifications, unequal in size, but subregularly arranged.

l. Stuffed, 5 feet long. Thames.—Back covered with very irregular stellate ossifications.

m. Stuffed, $4\frac{1}{2}$ feet long. Teignmouth. Purchased of the Zoological Society.—Back covered with stellate ossifications, subequal in size, and subregularly arranged.

n–o. Heads of large specimens: dried. Teignmouth. Purchased of the Zoological Society.

p, q. Young. England. From the Collection of the Zoological Society.

r. Stuffed, $7\frac{1}{2}$ feet long.—Back and abdomen covered with smoothish scale-like ossifications, arranged in regular oblique rows.

s, t, u–w. Young.—Skin sometimes prickly, sometimes with larger ossifications.

x. Stuffed, 17 inches long. English coast.—Skin with simple minute prickles.

y. Young: skin. Holland. From Gronow's Collection.

z. Young. Rhine. Presented by Dr. A. Günther.

α. Skeleton, $7\frac{1}{2}$ feet long.

β. Skeleton, 5 feet long. Purchased of the Zoological Society.

γ. Skull of a very large example.

δ. Intestines of two adult examples.

β. *American examples.*

a–b. Stuffed, 3 and 1 feet long. North America. Presented by E. Doubleday, Esq.

c. Fine specimen. New York.

d. Twenty inches long. From the Collection of Dr. van Lidth de Jeude.

I am unable to say whether the specimen named last is really North-American, as, indeed, it is impossible to refer every example of which the origin is not known, to the European or North-American form. The latter appears to have generally the stellate ossifications somewhat rougher than the European form.

18. **Acipenser agassizii.**

Acipenser (Antaceus) agassizii, *Duméril, Nouv. Arch. Mus.* 1867, p. 181, pl. 11. fig. 2.

Snout produced, the eye occupying the middle of the length of the head; barbels short, simple. Osseous shields well developed, 9 on the back, 28–29 on the side, and 10 along the abdomen. Skin with numerous stellate ossifications and small scutellæ. A part of the anal fin below the dorsal. D. 41. (*Dum.*)

California.

19. **Acipenser acutirostris.**

Acipenser acutirostris, *Ayres, Proc. Cal. Ac. Nat. Sc.* 1854, p. 15; *Duméril, Nouv. Arch. Mus.* 1867, p. 186.

Acipenser (Antaceus) alexandri, *Duméril, l. c.* p. 183, pl. 15. fig. 1.
—— (——) oligopeltis, *Duméril, l. c.* p. 184, pl. 15. fig. 2.

Snout long, rather longer than the remaining part of the head; barbels simple. Osseous shields well developed, 9–11 on the back, 27–29 * on the side, and 9–10 on the abdomen. Skin with numerous stellate ossifications, unequal in size. Part of the anal fin below the dorsal. D. 30–37.

California.

2. SCAPHIRHYNCHUS.

Scaphirhynchus, *Heckel, Ann. Wien. Mus.* i. 1835, p. 71.

Posterior part of the tail attenuated and depressed, so that it is entirely enveloped by the osseous scutes. Spiracles none. The caudal rays do not extend to the extremity of the tail, which terminates in a filament.

Mississippi and tributaries.

1. Scaphirhynchus cataphractus.

Acipenser cataphractus, *Gray, Proc. Zool. Soc.* 1834, p. 122.
Scaphirhynchus rafinesquii, *Heckel, l. c.* pl. 8; *Brutzer, De Sc. r. disquisitiones anatomicæ, Dissert. Dorpat.* 1860.
Acipenser platorhynchus, (*Rafinesque*) *Kirtland, Bost. Journ. Nat. Hist.* v. p. 25, pl. 8. fig. 1.
Scaphirhynchus platirhynchus, *Girard, U. S. Pac. R. R. Exp. Fish.* p. 357.

Snout spatulate; 15–16 scutes along the back, 40–46 on the side, and 10–13 along the abdomen.

Mississippi and tributaries.

a–b. Stuffed, 4 and 2½ feet long. Ohio.
c. Fine specimen. New Orleans. Purchased of Mr. Cuming.
d. Half-grown. North America. Purchased of Mr. Brandt.
e. Half-grown: stuffed. North America.
f. Adult: skeleton.

---

* The number 49 is a misprint in Dr. Ayres's description.

Fam. 2. POLYODONTIDÆ.

Spatulariæ, *Müller, Abhandl. Ak. Wiss. Berlin,* 1844, p. 147.

Body naked, or with minute stellate ossifications. Mouth lateral, very wide; jaws with minute teeth. Nostrils double. Barbels none. Caudal fin with fulcra. Dorsal and anal fins approximate to the caudal, which is heterocercal. Four gills and a half; no opercular gill or pseudobranchia.

Mississippi and Yantsekiang.

One genus only.

1. POLYODON.

Polyodon, *Lacép.* i. p. 402.
Spatularia, *Shaw, Zool.* v. p. 362.
Planirostra, *Lesueur.*

Body elongate, rather compressed, naked or with minute stellate ossifications. The snout is produced into an exceedingly long, shovel-like process, thin and flexible on the sides. Mouth lateral, behind the rostral projection, exceedingly wide. The maxillary and lower jaw are armed with a series or narrow band of minute teeth. A band of similar teeth on the palatine bones. No tongue. Nostrils double, immediately in front of the eye. Fins as in *Acipenser,* the lower caudal lobe being nearly as long and broad as the upper. Spiracles present. Gill-cover terminating in a very long tapering flap; gill-membranes continuous below the throat, and free from the isthmus. One broad branchiostegal. Four gills and a half; each branchial arch with a double series of very long setiform gill-rakers, the two series being divided by a broad membrane (*P. folium*). No opercular gill; no pseudobranchia. Air-bladder cellular, not bifid, communicating with the dorsal wall of the œsophagus. Stomach cæcal. Pyloric appendages in the form of a short, broad, leaf-like organ, with four or five larger divisions, each being subdivided. Rectum with a fully developed spiral valve.

Mississippi and Yantsekiang.

1. Polyodon folium.

Mauduit, in Rozier, Journ. Phys. iv. p. 384, pl. 2.
Polyodon folium, *Lacép.* i. p. 403; *Mitch. Sillim. Journ.* xii. 1827, p. 201; *Kirtland, Bost. Journ. Nat. Hist.* iv. p. 21, pl. 2. fig. 1.
Spatularia reticulata, *Shaw, Zool.* v. p. 362, pl. 156.
Platirostra edentula, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 223; *Kirtland, l. c.* v. p. 22, pl. 7. fig. 2.
Planirostra spatula, *Owen, Osteol. Catal.* i. p. 83.

The shovel-like process is about one-fourth of the entire length in adult examples, but only two-fifths in young. The opercular flap extends far beyond the pectorals in old examples, and nearly to the ventrals in young. Gill-rakers exceedingly fine and numerous. Upper caudal fulcra narrow, from sixteen to twenty in number.

Mississippi and tributaries.

a. Stuffed, 5 feet long.

b, *c*, *d–e*, *f–h*. Half-grown and young (in spirits). Mississippi.

2. **Polyodon gladius.**

Polyodon gladius, *Martens, Monatsber. Ak. Wiss. Berl.* 1861, p. 476; *Duméril, Nouv. Arch. Mus.* iv. p. 105, pl. 22. fig. 2.

—— (Spatularia) angustifolium, *Kaup, Wiegm. Arch.* 1862, p. 278.

The shovel-like process is much narrower than the head; opercular flap not extending beyond the pectoral fin. Gill-rakers in moderate number, and distant from one another. Upper caudal fulcra large, six in number.

Yantsekiang.

Subclass IV. CHONDROPTERYGII.

Skeleton cartilaginous; skull without sutures. Body with medial and paired fins, the hinder pair abdominal; caudal fin with produced upper lobe. Gills attached to the skin by the outer margin, with several intervening gill-openings; rarely one gill-opening only. No gill-cover. No air-bladder. Three series of valves in the bulbus arteriosus. Intestine with a spiral valve. Optic nerves commissurally united, not decussating. Ovaries with few and large ova, which are impregnated and, in some, developed internally. Embryo with deciduous external gills. Males with prehensile organs attached to the ventral fins.

This subclass, for which also the name *Elasmobranchii* has been proposed (*Bonaparte*), comprises the Sharks and Rays, and is divided into two orders:—

I. **Holocephala.** One external gill-opening only (p. 348).
II. **Plagiostomata.** From five to seven gill-openings (p. 353).

Order I. HOLOCEPHALA.

One external gill-opening only, covered by a fold of the skin, which encloses a rudimentary cartilaginous gill-cover; four branchial clefts within the gill-cavity. The maxillary and palatal apparatus coalescent with the skull.

Holocephala, *Müller, Abhandl. Ak. Wiss. Berl.* 1834, p. 74.

One family only.

Fam. 1. CHIMÆRIDÆ.

Form of the body elongate; pectoral fins free; anterior dorsal fin above the pectorals. Mouth inferior. Dental organs confluent into two pairs of laminæ in the upper jaw, and into one pair in the lower. No spiracles. Males with a peculiar prehensile organ on the upper part of the snout. Skin naked in the adult.

Two genera:—

Snout without appendage .... 1. Chimæra, p. 349.
Snout terminating in an appendage ...... 2. Callorhynchus, p. 351.

1. CHIMÆRA.

Chimæra, sp., *L. Syst. Nat.* i. p. 401.

Snout soft, prominent, without appendage. The dorsal fins occupying the greater part of the back, anterior with a very strong and long spine. Longitudinal axis of the tail nearly the same as that of the trunk, its extremity being provided with a low fin above and below, similar in form to a dorsal and an anal fin. Anal fin very low.

Coasts of Europe; Northern Pacific; Cape of Good Hope.

1. Chimæra monstrosa.

Simia marina, *Gesner, De Aquat.* p. 877; *Aldrov.* p. 405; *Jonston,* p. 16, tab. 7. fig. 6.
Galeus, *Clus. Exot.* p. 136 (cop. by *Willughby,* p. 57, tab. B 9. fig. 6, and *Jonston,* tab. 45. fig. 2).
Centrina, *Aldrov.* pp. 402, 403.
Chimæra monstrosa, *L. Mus. Ad. Frid.* i. p. 53, pl. 25; *Syst. Nat.* i. p. 401; *Gunner, Drondhj. Selsk. Skr.* ii. 1763, p. 270, pls. 5 & 6; *Bl.* iv. p. 69, tab. 124; *Bl. Schn.* p. 349; *Lacép.* i. p. 392, pl. 19. fig. 1; *Turton, Brit. Faun.* p. 114; *Faber, Fische Isl.* p. 41; *Donovan, Brit. Fish.* v. pl. iii.; *Flem. Brit. An.* p. 172; *Gaimard, Voy. Isl. et Groenl. Zool.* pl. 20; *Bonap. Faun. Ital. Pesc.*; *Jenyns, Man.* p. 494; *Costa, Faun. Nap. Chondrott. Chim.* pp. 1–47, pls. 1–7 (anatomy); *Schleg. Faun. Japon. Poiss.* p. 300, pl. 132; *Bennett, in Beechey, Voy. Fish.* p. 72, pl. 23. fig. 3; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 483, and 3rd edit. ii. p. 464; *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 309; *Kröyer, Danm. Fisk.* iii. p. 783; *Duméril, Elasmobr.* p. 686, pl. 13. figs. 3 & 4, pl. 14. fig. 1.
—— argentea, *Ascan. Ic.* pl. 15.
Northern Chimæra, *Penn. Brit. Zool.* ed. 1812, iii. p. 159; *Couch, Fish. Brit. Isl.* i. p. 145, pl. 34.
Chimæra borealis, *Shaw, Gen. Zool.* v. 2. p. 365, pl. 157.
—— mediterranea, *Risso, Eur. Mérid.* iii. p. 168.
—— cristata, *Faber, Fish. Isl.* p. 45; *Duméril, Elasmobr.* p. 688.
Callorhynchus centrina, *Gronov. Syst.* ed. *Gray,* p. 15.
—— atlanticus, *Gronov. l. c.* p. 16.

Tail terminating in a very long finless filament, about as long as the body and head. The first dorsal fin close to and subcontinuous with the second, low dorsal fin, the upper margin of which is even, not notched, except just in front of the caudal fin, which is also low. Each clasper of the male is divided into two long, slender branches, which are rather longer than the snout; and the inner branch is again longitudinally divided into a simply cartilaginous styliform part and another coated with the spiny membrane. Brown, marbled with lighter; dorsal fins with a broad black margin.

Coasts of Europe; Cape of Good Hope; Japan.

a–b. Adult male and female. Jutland. Presented by W. Edwards, Esq.
c–d. Adult male and female. North coast of Norway. Purchased of Mr. Brandt.
e. Adult male. Shetland Islands. Presented by J. Gwyn Jeffreys, Esq.
f. Adult female. Lisbon. Presented by the Rev. R. T. Lowe.
g. Adult female. Nice. Presented by Sir Ph. Egerton, Bart.
h. Adult male. Nice. From Dr. Deakin's Collection.
i. Adult male.
k, *l*. Adult and half-grown females.

2. Chimæra colliei.

Chimæra colliei, *Bennett, in Beechey's Voy. Zool.* p. 71, pl. 23. figs. 1 & 2; *Girard, U. S. & Pac. R. R. Exped. Fish.* p. 360; *Duméril, Elasmobr.* p. 689.
Hydrolagus colliei, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 331 (name only).

Tail simply tapering, without filament. Three dorsal fins, beside the caudal: the first, with the spine, is separated by a considerable interspace from the second; the three other fins low, subcontinuous. Each clasper of the male is divided into two club-shaped branches, which are rather shorter than the snout; both branches coated with the spiny membrane, and the inner is not subdivided. Brown, shining silvery, upper parts with round yellowish spots.

West Coast of North America.

a. Adult male. Esquimalt Harbour. From Mr. Lord's Collection.
b. Adult male, not in good state. Monterey. Presented by J. H. Gurney, Esq.
c. Adult male. From Mr. Goodridge's Collection.

3. Chimæra affinis.

Capello, Journ. Math. Phys. e Nat. Lisb. iv. 1868.

Body more elongate than in *Ch. monstrosa* and *Ch. colliei*, which are stouter and shorter. Second dorsal fin removed from the first a space equal to the length of the base of the latter. The second dorsal fin is much lower than in any of the other species, and with the free border straight, without undulations. The space between the first dorsal and the ventral fin is great, which causes the pectoral fin to terminate much in advance of the ventral; which is not the case in any of the allied species, since in *monstrosa* the pectorals attain to the posterior extremity of the ventrals, and in the American species to the origin of those fins. Caudal fin very small, and terminating in a minute filament. The anterior (cephalic) appendages present five spines on the inner surface; in *Ch. colliei* these organs have only two spines. Finally, the posterior appendages are tripartite, as in *Ch. monstrosa*, but the division of the three portions takes place at two-thirds from the base; moreover the cylindrical portion is larger, and presents a form different from that in the others. (*Capello.*)

Coast of Portugal.

2. CALLORHYNCHUS.

Callorhynchus, *Gronov. Mus. Ichth.* i. p. 59.

Snout with a cartilaginous prominence, terminating in a cutaneous flap. Two dorsal fins, the anterior with a very strong and long spine. Extremity of the tail distinctly turned upwards, with a fin along its lower edge, but without one above. Anal fin close to the caudal, short and deep.

Southern Pacific; Cape of Good Hope.

1. Callorhynchus antarcticus.

Acipenser no. 10, *Klein, Pisc. Miss.* iii. p. 16.
Callorhynchus, sp., *Gronov. Zoophyl.* no. 141, tab. 4. figs. 1 & 2; *Mus. Ichth.* i. p. 59. no. 130.
Chimæra callorhynchus, *L. Syst. Nat.* i. p. 402.
—— antarctica, *Lacép.* i. p. 400, pl. 12. fig. 2.
—— australis, *Shaw, Gen. Zool.* v. 2. p. 368, pls. 158 & 158*.
Callorhynchus antarcticus, *Cuv. Règ. An.*; *Gay, Chile, Zool.* ii. p. 358; *Duméril, Elasmobr.* p. 693, pl. 13 (head).
—— tasmanius, *Richards. Trans. Zool. Soc.* iii. p. 696.
—— milii, *Bory St. Vincent, Dict. Class. Hist. Nat.* iii. p. 62, pl. 5.
—— smythii, *Benn. Beechey's Voy. Fish.* p. 75, pl. 22. fig. 3 (young; bad).
—— elephantinus, *Gronov. Syst.* ed. *Gray*, p. 15.
—— peronii, *Duméril, Elasmobr.* p. 694, pl. 14. fig. 4 (young).
—— capensis, *Duméril, Elasmobr.* p. 695.
—— australis, *Owen, Osteol. Catal.* i. p. 89.

The second dorsal fin elevated in front. Pectoral fin very large, extending generally to, or even beyond, the base of the ventral. Claspers subcylindrical, with a channel along the interior, opening by a lateral slit. Adult with an obscure blackish lateral band. Young with the upper parts black, and with whitish bands and spots. The young have also a double series of very small dermal spines on the crown of the head, and on the back of the trunk and tail; these spines are also sometimes found in half-grown and adult examples, in which, however, they are hidden in the skin.

Southern Pacific; Cape of Good Hope.

a–b. Male and female, 34 inches long. Cape of Good Hope. Purchased.

c. Female, stuffed, 40 inches long. South Africa. Purchased. (*C. capensis*, Duméril.)

d. Young. South Africa. From Sir A. Smith's Collection.

e. Female, 30 inches long. Australia. From the Haslar Collection. (*C. tasmanius*, Rich.)

f. Young. Australia. Purchased of Mr. Cuming.

g–h. Adult male and female: stuffed. South Australia.

i. Adult male, not in good state. Kangaroo Island. From the Collection of the Zoological Society.

k. Half-grown female. Port Denison.

l–m. Young. New Zealand. Presented by Capt. Stokes.

n–o. Young. Chiloe. From Dr. Cunningham's Collection. (*C. smythii* or *peronii*, Duméril.)

p. Young. From the Collection of Dr. van Lidth de Jeude.

q. Jaws of an adult example.

Order II. PLAGIOSTOMATA.

From five to seven gill-openings. Jaws distinct from skull.

This order has been divided into two suborders, which are intimately connected with each other, and scarcely entitled to that rank:—

I. **Selachoidei.** Trunk gradually passing into the tail. Gill-openings lateral (p. 353).
II. **Batoidei.** Gill-openings ventral (p. 434).

First Suborder. SELACHOIDEI.

Body more or less cylindrical, gradually passing into the tail. Gill-openings lateral.—Sharks.

Synopsis of the Families, Groups, and Genera.

Fam. 1. CARCHARIIDÆ.

Eye with a nictitating membrane. An anal fin; two dorsals.

Group A. *Teeth with a single cusp with sharp edges, smooth or serrated, erect or oblique. Snout produced longitudinally.*
A. Carchariina.

1. *A pit at the root of the tail.*

Spiracles none .... 1. *Carcharias*, p. 357.
Spiracles minute, pore-like. Only the upper teeth with denticulations. Distinct labial folds .... 2. *Hemigaleus*, p. 375.
Spiracles minute. Teeth oblique, without any denticulation. 3. *Loxodon*, p. 376.
Spiracles small. Teeth serrated in both jaws. Caudal fin with a double notch .... 4. *Galeocerdo*, p. 377.
Spiracles of moderate size. Teeth serrated in both jaws. Caudal fin with a single notch .... 5. *Thalassorhinus*, p. 378.

2. *No pit at the root of the tail.*

Small spiracles .... 6. *Galeus*, p. 379.

Group B. *Teeth with a single cusp, with sharp edges, oblique. Head laterally elongate, hammer-shaped. Nostrils on the front edge of the head* .... **B. Zygænina.**

Spiracles none .... 7. *Zygæna*, p. 380.

Group C. *Teeth small, either with a central cusp and one or two small lateral cusps, or obtuse, the cusps being obsolete.*
C. **Mustelina.**

1. *A pit at the root of the tail: a small pit behind the angle of the mouth.*

Spiracles none .... 8. *Triænodon*, p. 383.

2. *No pit at the root of the tail; labial folds well developed.*

Spiracles none; teeth with acute cusps .. 9. *Leptocarcharias*, p. 384.
Spiracles small; teeth with acute cusps.. 10. *Triacis*, p. 384.
Spiracles small; teeth obtuse .... 11. *Mustelus*, p. 385.

Fam. 2. LAMNIDÆ.

No nictitating membrane. An anal fin; two dorsals, the first opposite to the space between pectorals and ventrals. Nostrils not confluent with the mouth, which is inferior. Spiracles none, or minute.

Group A. *Teeth large or of moderate size. On each side of the upper jaw, at some distance from the symphysis, there is one or two teeth conspicuously smaller than the others.*
A. **Lamnina.**

1. *Gill-openings very wide; side of the tail with a keel.*

Teeth lanceolate, not serrated .... 12. *Lamna*, p. 389.
Teeth triangular, serrated.... .... 13. *Carcharodon*, p. 391.

2. *Gill-openings of moderate width; side of the tail without keel.*

Teeth large, awl-shaped, with small additional basal cusps.
14. *Odontaspis*, p. 392.
Teeth of moderate size, triangular, not serrated.
15. *Alopecias*, p. 393.

Group B. *Teeth very small, numerous, conical, simple. Gill-openings very wide* .... B. **Selachina.**

Side of the tail with a keel .... 16. *Selache*, p. 394.

[*Teeth very small, tricuspid. Gill-openings rather narrow.*

First dorsal very low and long .... 17. *Pseudotriacis*, p. 395.]

Fam. 3. RHINODONTIDÆ.

No nictitating membrane. An anal fin; two dorsals, the first nearly opposite to the ventrals. Mouth terminal.

Side of the tail with a keel .... 18. *Rhinodon*, p. 396.

Fam. 4. NOTIDANIDÆ.

No nictitating membrane. One dorsal fin only.

No pit at the root of the caudal .... 19. *Notidanus,* p 397.

Fam. 5. SCYLLIIDÆ.

No nictitating membrane. The first dorsal fin above or behind the ventrals; an anal fin; mouth inferior. Teeth small, several series being generally in function.

1. *Nasal and buccal cavities separate.*

Upper edge of the caudal fin not serrated.. 20. *Scyllium,* p. 400.
Upper edge of the caudal fin serrated .... 21. *Pristiurus,* p. 406.

2. *Nasal and buccal cavities confluent.*

Spiracles minute, behind the eye; the second dorsal nearly opposite to the anal .... 22. *Ginglymostoma,* p. 407.
Tail and caudal exceedingly elongate; snout very obtuse. 23. *Stegostoma,* p. 409.
Spiracles minute, below the posterior angle of the orbit; origin of the anal in advance of the second dorsal .. 24. *Parascyllium,* p. 410.
Spiracles very distinct, below the eye; anal placed far behind the second dorsal; sides of the head without appendages. 25. *Chiloscyllium,* p. 410.
Spiracles wide, oblique slits; sides of the head with skinny appendages. 26. *Crossorhinus,* p. 413.

Fam. 6. CESTRACIONTIDÆ.

No nictitating membrane. Two dorsal fins, the first opposite to the space between pectoral and ventral fins; an anal. Nasal and buccal cavities confluent. Teeth obtuse, several series being in function.

Spiracles small, below the eye .... 27. *Cestracion,* p. 415.

Fam. 7. SPINACIDÆ.

No nictitating membrane. No anal fin. Pectorals not notched at their root. Snout without lateral armature.

1. *Each dorsal fin with a spine; a fold of the skin running along each side of the belly.*

Trunk elevated, triedral .... 28. *Centrina,* p. 417.

2. *Each dorsal fin with a spine; no lateral fold of the skin.*

Teeth equal in both jaws, oblique ...... 29. *Acanthias,* p. 417.
Upper teeth erect, with a single cusp; lower more or less oblique. 30. *Centrophorus,* p. 419.

Upper teeth erect, tricuspid, the lower oblique.
31. *Spinax*, p. 424.
Teeth equal in both jaws, very small, tricuspid.
32. *Centroscyllium*, p. 425.

3. *Dorsal fins without spine: the first conspicuously in advance of the ventrals.*

Dorsal fins equally short. Lower teeth erect, triangular.
33. *Scymnus*, p. 425.
Dorsal fins equally short. Lower teeth oblique, truncate.
34. *Læmargus*, p. 426.
The second dorsal much longer than the first.
35. *Euprotomicrus*, p. 427.

4. *Dorsal fins without spine; the first opposite to the ventrals.*

Teeth equal in both jaws, large, very oblique, denticulated.
36. *Echinorhinus*, p. 428.
The lower teeth much larger than the upper, erect, not serrated.
37. *Isistius*, p. 429.

Fam. 8. RHINIDÆ.

No anal fin. Pectorals deeply notched in front at the root.

Mouth anterior .... 38. *Rhina*, p. 430.

Fam. 9. PRISTIOPHORIDÆ.

Snout much produced, with lateral teeth, saw-like.

Two barbels at the lower side of the saw. 39. *Pristiophorus*, p. 431.

Fam. 1. CARCHARIIDÆ.

The first dorsal fin opposite to the space between pectoral and ventral fins, without spine; an anal fin. Eye with a nictitating membrane. Mouth crescent-shaped, inferior.

Group A. CARCHARIINA.

1. CARCHARIAS.

Carcharias, *Cuv., Müll. & Henle.*

The first dorsal fin opposite to the space between pectorals and ventrals, without spine. A pit at the root of the caudal, which has a distinct lower lobe. Membrana nictitans present. Spiracles none. Mouth crescent-shaped; the labial groove or fold is confined to, or does not extend much beyond, the angle of the mouth. Snout produced longitudinally. Teeth with a single sharp cusp, more or less dilated and triangular.

Seas of the temperate and tropical regions.

The number of species of true Sharks has been unduly multiplied; and therefore their determination has become a matter of some difficulty. Müller and Henle have distinguished the following subgenera:—

A. None of the teeth denticulated *.
    a. The upper and lower teeth oblique, not swollen at the base. *a. Scoliodon*, p. 357.
    b. The lower teeth swollen at the base, points slender. *β. Physodon*, p. 360.
    c. The lower teeth erect .... *γ. Aprionodon*, p. 361.
B. Some or all the teeth denticulated.
    a. Only the base of the upper teeth with denticulations. *δ. Hypoprion*, p. 362.
    b. The base as well as the cusp of some or of all the teeth serrated. *ε. Prionodon*, p. 363.

a. SCOLIODON †.

Scoliodon, *Müll. & Henle.*

Carcharias with oblique flat teeth in both jaws, without any serrature.

---

* It must be remarked that in the young of at least some of the species of *Prionodon* the teeth are not serrated, and that such examples may be taken for *Scoliodon.*

† 1. Squalus porosus, *Poey, Mem. Cuba,* ii. p. 339, pl. 19. figs. 11, 12 (teeth).—Cuba.

Synopsis of the Species.

a. Length of the anal nearly equal to its distance from the ventrals. 1. *laticaudus.*

b. Length of the anal much less than its distance from the ventrals.
  - *α.* Labial groove none on the upper jaw.
    - *aa.* Length of the snout nearly equal to the distance of the eye from the gill-opening .... 2. *acutus.*
    - *bb.* Length of the snout nearly equal to the distance of the eye from the pectoral.................. 3. *dumerilii.*
  - *β.* A short labial groove on the upper jaw. Distance between the outer angles of the nostrils:—
    - *aa.* equal to that of the nostril from the extremity of the snout. 4. *walbeehmii.*
    - *bb.* much more than that of the nostril from the extremity of the snout.. .... 5. *terræ novæ.*

1. Carcharias laticaudus.

Carcharias (Scoliodon) laticaudus, *Müll. & Henle,* p. 28, pl. 8; *Duméril, Elasmobr.* p. 343.
—— (——) macrorhynchus, *Bleek. Verh. Bat. Gen.* xxiv. *Plagiost.* p. 31, pl. 1. fig. 1; *Duméril, l. c.*

Pectoral fin with the posterior margin nearly straight, the upper angle being nearly a right one; it terminates at some distance from the origin of the dorsal fin. The length of the base of the anal fin is equal to or but little less than its distance from the ventral; its pointed terminal lobe terminates at a distance from the root of the caudal fin. Terminal caudal lobe obliquely truncated. A very short labial groove at the angle of the mouth, not extending on the upper jaw, and for a very short distance only on the lower. Length of the snout (from the front margin of the mouth) equal to, or a little more than, the distance of the eye from the gill-opening. Pectoral fins black.

East Indies; China and Japan.

a–b. Young. Bengal. Presented by General Hardwicke.
c. Adult (18 inches). East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *C. macrorhynchus.*
d, e–f. Half-grown and young. China.
g, h. Several half-grown examples. Amoy. From Consul Swinhoe's Collection.
i. Adult. Japan. Purchased of Mr. Jamrach.
k, l. Adult and young.

2. Carcharias acutus.

Carcharias acutus, *Rüpp. N. W. Fische,* p. 65, pl. 18. fig. 4.
Squalus russellii, *Gray, Ill. Ind. Zool.*
Carcharias (Scoliodon) acutus, *Müll. & Henle,* p. 29; *Cant. Mal. Fish.* p. 399; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 30; *Duméril, Elasmobr.* p. 345.

Pectoral fin with the posterior margin slightly concave and the upper angle pointed, extending to, or somewhat beyond, the origin of the dorsal fin. The length of the base of the anal fin is one-half, or less than one-half, of its distance from the ventral; its pointed terminal lobe terminates not far from the root of the caudal fin. Terminal caudal lobe tapering. A very short labial groove at the angle of the mouth, *not extending on the upper jaw,* and for a very short distance only on the lower. Length of the snout (from the front margin of the mouth) equal to, or a little less than, the distance of the eye from the gill-opening. Posterior margin of the pectoral whitish, upper margin of the caudal blackish.

Indian Ocean and archipelago to Japan.

a. Half-grown: stuffed. Cape Seas. From Sir A. Smith's Collection.
b. Adult female (17 inches). East-Indian archipelago. From Dr. Bleeker's Collection.
c. Adult female: stuffed. Pinang. From Dr. Cantor's Collection.
d. Adult female. Singapore.
e. Young. Vizagapatam. Presented by Capt. Mitchell.
f. Adult male. Japan. Purchased of Mr. Jamrach.
g. Adult. From the Haslar Collection.

3. Carcharias dumerilii.

Carcharias (Scoliodon) dumerilii, *Bleek. Act. Soc. Indo-Neerl.* i. *Amboina,* p. 70.

Pectoral fin with the posterior margin slightly concave and the upper angle much pointed, extending to or somewhat beyond the origin of the dorsal fin. The length of the base of the anal fin is one-third, or less than one-third, of its distance from the ventral; its pointed terminal lobe terminates at a great distance from the root of the caudal fin. Terminal caudal lobe tapering. A very short labial groove at the angle of the mouth, not extending along either of the jaws. Length of the snout (from the front margin of the mouth) equal to, or only a little less than, the distance of the eye from the root of the pectoral fin. Pectoral fins black, with a narrow whitish margin.

Amboyna.

a. Type of the species. From Dr. Bleeker's Collection.
b. Half-grown. Purchased of Hr. Frank.

4. Carcharias walbeehmii.

Carcharias (Scoliodon) walbeehmi, *Bleek. Nat. Tyds. Ned. Ind.* x. p. 353.

Pectoral fin with the posterior margin slightly concave and the upper angle pointed, extending somewhat beyond the origin of the dorsal fin. The length of the base of the anal fin is about two-fifths of its distance from the ventral; its pointed terminal lobe terminates at some distance from the root of the caudal fin. Terminal caudal lobe tapering. A short labial groove at the angle of the mouth *extending for a short distance on the upper jaw, as well as the* *lower.* Length of the snout (from the front margin of the mouth) more than the distance of the eye from the gill-opening. Distance between the outer angles of the nostrils equal to that of the nostril from the extremity of the snout. Coloration uniform.

East-Indian archipelago; Japan.

a. Type of the species. From Dr. Bleeker's Collection.
b. Fine specimen. Japan. Purchased of Mr. Jamrach.

5. **Carcharias terræ novæ.**

Squalus (Carcharias) terræ novæ, *Richards. Faun. Bor.-Amer.* iii. p. 289.

Carcharias (Scoliodon) lalandii, *Müll. & Henle,* p. 30; *Duméril, Elasmobr.* p. 346.

—— (Scoliodon) terræ novæ, *Gill, Catal. Fish. East. Coast N. Amer.* 1861, p. 59; *Duméril, l. c.*

Pectoral fin with the posterior margin slightly concave and the upper angle pointed, extending beyond the origin or below the middle of the dorsal fin. The length of the base of the anal fin is about one-third of its distance from the ventral; its pointed terminal lobe terminates at a great distance from the root of the caudal fin. Terminal caudal lobe tapering *. A short labial groove at the angle of the mouth extending *for a short distance on the upper jaw as well as the lower.* Length of the snout (from the front margin of the mouth) equal to the distance of the eye from the gill-opening. Distance between the outer angles of the nostrils conspicuously more than that of the nostril from the extremity of the snout. Caudal fin with a narrow blackish edge.

Newfoundland, West Indies, and South America.

a. Fine specimen. St. Croix. Purchased of Mr. Stevens.
b. Stuffed, 31 inches long. Jamaica.
c–d. Skins, young. Jamaica. From Dr. Parnell's Collection.
e. Stuffed, 22 inches long. West Indies. Purchased of Mr. Scrivener.
f. Half-grown. Bahia. From Dr. Wucherer's Collection.
g. Young male. Purchased of Mr. Brandt.

β. PHYSODON.

Physodon, *Müll. & Henle.*

Carcharias with the teeth in the middle of the lower jaw small, those on the sides being much larger, swollen at the base, and provided with an oblique, narrow cusp. The upper teeth flat and oblique. None denticulated.

6. **Carcharias mülleri.**

Müller & Henle, p. 30, pl. 19. fig. 1 (teeth); *Duméril, Elasmobr.* p. 347.

Snout elongate and pointed; mouth nearly as long as broad.

---

* In mature examples. In young individuals it is, like the other fins, more obtuse.

End of the base of the first dorsal opposite to the origin of the ventrals. Second dorsal very small; anal in advance of the second dorsal.

Bengal.

γ. Aprionodon.

Aprion, *Müller & Henle*, p. 31.

Aprionodon, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. pp. 401, 411.

Carcharias with none of the teeth serrated, all narrowed, on a broad base; the lower erect; the upper erect or only slightly oblique.

7. Carcharias brevipinna.

Carcharias (Aprion) brevipinna, *Müll. & Henle*, p. 31, pl. 9; *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 509.

Snout broad, much prolonged, its length (from the front margin of the mouth) being equal to the distance of the eye from the gill-opening. A very short labial fold at the angle of the mouth, not extending along either of the jaws. Gill-openings wide, the width of each being equal to the distance between the first and last. Pectorals subfalciform, extending to the end of the dorsal fin. The second dorsal much smaller than the first.

Java.

a. Fine specimen. From Dr. Bleeker's Collection.

8. Carcharias punctatus.

Squalus punctatus, *Mitch. Lit. & Phil. Trans. New York*, i. p. 483.

Carcharias (Aprion) isodon, *Müller & Henle*, p. 32.

Aprionodon punctatus, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 401, and *Proc. Ac. Nat. Sc. Philad.* 1864, p. 262.

Carcharias (Aprionodon) isodon, *Duméril, Elasmobr.* p. 349.

The distance of the extremity of the snout from the mouth equals that between the nostrils. Pectoral fin subfalciform, extending to the end of the dorsal. The second dorsal much smaller than the first.

New York.

9. Carcharias acutidens.

Carcharias acutidens, *Rüpp. N. W. Fisch.* p. 65, taf. 18. fig. 3.

—— (Aprion) acutidens, *Müll. & Henle*, p. 33.

—— (Aprionodon) acutidens, *Duméril, Elasmobr.* p. 349.

Snout short and obtuse. Pectoral fins pointed, but little extending beyond the origin of the dorsal. The second dorsal fin is but little smaller than the first, and very similar in size and form to the anal. Nostril with a very distinct valve at its lower half. A short groove at the angle of the mouth. Gills of moderate width. Teeth $\frac{27-29}{27-29}$.

Red Sea; Indian Ocean.

a. Fine specimen, 33 inches long. Seychelles. From Professor E. P. Wright's Collection.

δ. HYPOPRION.

Hypoprion, *Müll. & Henle.*
Hypoprionodon, *Gill.*

Carcharias with the upper teeth denticulated on the base only. Lower teeth without denticulations.

10. **Carcharias macloti.**

Carcharias (Hypoprion) macloti, *Müll. & Henle,* p. 34, pl. 10; *Duméril, Elasmobr.* p. 350.

Snout long, pointed, the nostrils being nearer to the mouth than to the extremity of the snout. The teeth of the upper jaw with the base denticulated on both sides.

Indian Ocean; New Guinea.

11. **Carcharias brevirostris.**

Hypoprion brevirostris, *Poey, Repert. Fis.-nat. Cuba,* 1868, p. 451.

Snout obtuse. The teeth of the upper jaw with the base denticulated on both sides; the lower erect. Fins without black spots. (*Poey.*)

Cuba.

The same author (*l. c.* p. 452) has described another Cuban species from a pair of jaws, naming it *Hypoprion signatus.* He says that it agrees with *H. macloti* with regard to the dentition, but that it must be a distinct species on account of the different locality. Teeth $\frac{3}{3}\frac{2}{2}$, the upper and lower slightly oblique.

12. **Carcharias hemiodon.**

Carcharias (Hypoprion) hemiodon, *Müll. & Henle,* p. 35, pl. 19. fig. 2 (teeth); *Duméril, Elasmobr.* p. 351.

Hypoprionodon hemiodon, *Gill, Ann. Lyc. Nat. Hist. New York,* vii. p. 409 (name only).

Snout obtusely rounded, the nostrils being midway between the mouth and the extremity of the snout. The distance between the mouth and extremity of the snout equals that between the outer angles of the nostrils. The teeth of the upper jaw oblique, with the base denticulated on the outer part only.

Indian Seas.

a. Male, 28 inches long: stuffed. India. Presented by T. E. J. Boileau, Esq.
b. Female, 31 inches long: stuffed. Calcutta. Purchased of Mr. Bartlett.
c. Female, 23 inches long.

13. **Carcharias playfairii.**

Snout short, obtusely rounded, the distance of the end of the snout and the mouth being rather more than the length, and two-thirds the width, of the mouth. Nostrils midway between the mouth and the end of the snout. Teeth of the upper and lower jaw similar in form, erect, constricted, on a broad two-rooted base; the upper rather broader than the lower, and with some obtuse denticulations on the base, $\frac{29}{28}$. Gill-openings much wider than the orbit. Pectoral fins of moderate length and width, not extending to the end of the dorsal fin, the length of their inner margin being one-third of that of the outer. Dorsal fin nearer to the root of the pectoral than to that of the ventrals. The second dorsal equal in size and form and exactly opposite to the anal, one-third the size of the first dorsal. Length of the caudal fin one-fourth of the total. Extremities of all the fins with a black spot.

Zanzibar.

a. Stuffed, 22 inches long. From Lieut.-Col. Playfair's Collection.

ε. PRIONODON [*].

Prionodon, *Müll. & Henle.*
Prionace, *Cantor.*
Eulamia, Isogomphodon, Lamiopsis, Platypodon, Isoplagiodon *et* Cynocephalus, *Gill.*

Carcharias with some or all the teeth serrated, not only on the base, but also on the edges of the cusp.

Synopsis of the Species.

A. The first dorsal is nearer to the ventrals than to the pectorals.
  Snout very long .... 14. *glaucus*, p. 364.
  Snout moderately produced .... 15. *munsing*, p. 365.

B. The first dorsal is nearer to or commences above the pectorals.
  a. The upper teeth oblique, serrated, with a notch in the outer margin.
    α. The lower teeth serrated.
      aa. Origin of the first dorsal at a very short distance from the root of the pectorals.
        aa. Snout produced, length of the lower margin of the pectoral being

---

[*] 1. Carcharias (Prionodon) zambezensis, *Peters, Monatsber. Ak. Wiss. Berl.* 1852, p. 276; and *Flussfische Mossamb.* p. 7, taf. 1. fig. 2.—East Africa.
2. —— (Prionodon) falciformis, *M. & H.* p. 47; *Guichenot, in Sagra, Cuba, Poiss.* p. 193, pl. 5. fig. 3; *Duméril, Elasmobr.* p. 374.—Cuba.
3. —— (——) henlei, *Duméril, Elasmobr.* p. 372 (not *M. & H.*).—South America.
4. —— (——) remotus, *Duméril, l. c.* p. 374.—West Indies.
5. Squalus cæruleus, *Mitch. Trans. Lit. & Phil. Soc. New York*, i. p. 487; Carcharias cæruleus, *Dekay, New York Faun. Fish.* p. 349, pl. 61. fig. 200; Lamna caudata, *Dekay, New York Faun. Fish.* p. 354, pl. 62. fig. 205; Carcharias (Prionodon) milberti, *M. & H.* p. 38, pl. 19. fig. 3 (teeth); *Duméril, Elasmobr.* p. 360; Eulamia milberti, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 262.—Atlantic and Mediterranean.
6. —— obtusus, *Poey, Mem. Cub.* ii. p. 337, tab. 19. figs. 7 & 8; Squalus platyodon, *Poey, l. c.* p. 336, tab. 19. figs. 5 & 6; Enlamia obtusa, *Poey, Repert. Fis.-nat. Cub.* 1868, p. 447, tab. 4. fig. 16.—Cuba.
7. —— maou, *Less. Voy. Coq. Zool.* ii. p. 91, *Poiss.* pl. 1.—Pomotou archipelago.

two-fifths of that of the upper; the second dorsal shorter than the anal .... 16. *porosus*, p. 365.
one-fourth of that of the upper. Gill-openings much wider than orbit. 17. *obscurus*, p. 366.
two-sevenths of that of the upper. Gill-openings as wide as orbit. 18. *sorrah*, p. 367.
two-fifths of that of the upper; the second dorsal not much smaller than anal .... 19. *dussumieri*, p. 367.

ββ. Snout very short and obtuse.

Coloration uniform; upper teeth with the notch very indistinct. 20. *gangeticus*, p. 367.
Coloration uniform; upper teeth distinctly notched. 21. *amblyrhinchus*, p. 368.
Body with dark transverse spots .... 22. *fasciatus*, p. 368.

bb. Origin of the first dorsal conspicuously distant from the root of the pectorals.

Fins without ornamental colours .... 23. *brachyurus*, p. 369.
All the fins with black extremities .... 24. *melanopterus*, p. 369.
Pectoral and caudal with black extremities, but no black on the first dorsal .... 25. *bleekeri*, p. 370.
Margins of the fins of a pure white .... 26. *albomarginatus*, p. 370.

β. The lower teeth without serrature.

The second dorsal entirely opposite to the anal. 27. *menisorrah*, p. 371.
The anal fin in advance of the second dorsal. 28. *borneensis*, p. 371.

b. The upper teeth not conspicuously oblique, serrated, broad, regularly triangular.

α. The lower teeth like the upper .... 29. *amboinensis*, p. 372.

β. The lower teeth narrow, on a broad, two-rooted base, serrated.

The second dorsal smaller than the anal.... 30. *lamia*, p. 372.
The second dorsal rather larger than the anal. 31. *glyphis*, p. 373.

c. The upper teeth erect, rather narrow, on a two-rooted base, serrated; the lower of a similar form.

The extremities of most of the fins black .. 32. *limbatus*, p. 373.
Fins without black...................... 33. *pleurotænia*, p. 374.

d. The upper and lower teeth slender, numerous.

Teeth $\frac{36\text{–}38}{38\text{–}40}$ .... 34. *temminckii*, p. 374.
Teeth $\frac{46\text{–}49}{46\text{–}49}$ .... 35. *oxyrhynchus*, p. 375.

14. Carcharias glaucus.

Blue Shark.
Galeus glaucus, *Rondel.* p. 378; *Gesner, De Aquat.* p. 609; *Aldrov.* p. 394; *Willughby*, p. 49.
Squalus, sp., *Artedi, Synon.* p. 98. no. 13, and *Gen.* p. 69. no. 13.
Squalus glaucus, *L. Syst. Nat.* i. p. 401; *Bl.* taf. 86; *Lacép.* i. p. 213; *Bl. Schn.* p. 131; *Risso, Ichth. Nice*, p. 26; *Turt. Brit. Faun.* p. 113; *Jenyns, Man.* p. 499; *Bonap. Faun. Ital. Pesc.*
Blue Shark, *Watson, Phil. Trans.* lxviii. pt. 2. p. 789, pl. 12; *Penn. Brit. Zool.* iii. p. 95, or, ed. 1812, iii. p. 143; *Couch, Fish. Brit. Isl.* i. p. 28, pl. 6.

Carcharias glaucus, *Cuv. Règne An.*; *Flem. Brit. An.* p. 167; *Yarrell, Brit. Fish.* 2nd ed. ii. p. 498, or, 3rd edit. ii. p. 482; *Gay, Hist. Chile, Zool.* ii. p. 364.
Squalus (Carcharinus) cæruleus, *Blainv. Faun. Fr.* i. p. 90.
—— (——) glaucus, *Blainv. l. c.* p. 92, pl. 23.
Carcharias (Prionodon) glaucus, *Müll. & Henle*, p. 36, pl. 11; *Duméril, Elasmobr.* p. 353; *Bocage & Capello, Peix. Plagiost.* p. 17.
—— (——) hirundinaceus, (*Val.*) *Duméril, l. c.* p. 354.

Snout very long, nostrils rather nearer to the mouth than to the extremity of the snout. No labial fold, except a groove at the angle of the mouth. Teeth of the upper jaw oblique, scarcely constricted near the base; lower teeth slender, triangular in young examples, lanceolate, with a broad base, in old ones*. Pectoral fin long, falciform, extending to the dorsal, which is nearer to the ventrals than to the root of the pectorals. Tail and caudal fin slender.

Tropical and temperate seas.

a. Stuffed, 11 feet long. English coast.
b. Young. Mediterranean. Purchased of Mr. Cutter.
c. Young. St. Helena. Presented by J. C. Melliss, Esq.
d. Young. Pondicherry.
e, f, g. Numerous fœtus. Port Arthur (Australia).
h. Stuffed, 4 feet long. From the Collection of the Zoological Society.
i. Young. From the Collection of the Zoological Society.
k-m. Jaws of very large examples.

15. **Carcharias munsing.**

Carcharias (Prionodon) munsing, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 32, pl. 1. fig. 2 (head).

Snout moderately produced, the distance between the mouth and extremity of the snout being nearly equal to the width of the mouth. No labial fold, except a groove at the angle of the mouth. Teeth of the upper jaw scarcely oblique, triangular, serrated; lower teeth slender, lanceolate, not serrated, with a broad base. Pectoral fins shorter than the head, longer than broad, scarcely emarginate. Dorsal fin nearer to the ventrals than to the root of the pectorals. (*Blkr.*)

Madura.

Known from two examples, about 15 inches long.

16. **Carcharias porosus.**

? Carcharias fissidens, *Benn. Proc. Comm. Zool. Soc.* 1830, p. 148.
Carcharias (Prionodon) porosus, *Ranzani, Nov. Comm. Ac. Sc. Bonon.* iv. 1840, p. 70, tab. 9; *Duméril, Elasmobr.* p. 373.
—— (——) henlei, *Müll. & Henle*, p. 46, pl. 19. fig. 6 (teeth).

---

* In very young examples the dentition is that of *Scoliodon*; then a few denticulations appear at the base. The serrature is most perfect in the upper and lower teeth in examples of a length of about 4 feet, in which the lower teeth form a nearly regular narrow triangle. In old examples the serrature is lost again, especially in the lower jaw, in which the teeth are very narrow, erect, or slightly oblique, standin upon a broad base.

Snout produced, the distance between its extremity and the mouth being more than the width of the latter. Nostrils midway between the mouth and the extremity of the snout. Teeth $\frac{27-26}{26}$ distinctly serrated; the upper oblique, with a notch at the base of the outer margin; the lower narrow, nearly erect. Gill-openings somewhat wider than the orbit. *Pectorals short*, scarcely extending to the end of the dorsal; *the length of their lower margin is two-fifths of that of the upper*. Origin of the first dorsal at a very short distance from the base of the pectorals, its end much more distant from the ventral. *The second dorsal very small and short*, its base being much shorter than that of the anal; it is opposite to the hind part of the anal. Coloration uniform.

Tropical parts of the Atlantic.

a–b. Fourteen inches long. Guyana. Presented by Sir R. Schomburgk.

17. Carcharias obscurus.

Squalus obscurus, *Lesueur, Journ. Ac. Nat. Sc. Philad.* 1818, i. p. 223, pl. 9.

Carcharias (Prionodon) obscurus, *Müll. & Henle*, p. 46; *Dekay, New York Faun. Fish.* p. 350, pl. 61. fig. 201 (cop. *Lesueur*); *Duméril, Elasmobr.* p. 371.

—— falcipinnis, *Lowe, Proc. Zool. Soc.* 1839, p. 90, 1843, p. 93; *Trans. Zool. Soc.* iii. p. 18.

Prionodon obvelatus, *Valenc. in Webb & Berthel. Iles Canar. Poiss.* p. 103, pl. 26 (bad); *Duméril, Elasmobr.* p. 376.

Platypodon obscurus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, pp. 262, 265.

Snout obtusely rounded, rather produced, the distance between its extremity and the mouth being somewhat less than the width of the mouth. Nostrils nearer to the mouth than to the extremity of the snout in old examples, and midway in young. Teeth $\frac{29}{30}$, the upper oblique, distinctly serrated, with a notch in the outer margin; the lower narrow, lanceolate, minutely serrated, on a broad base. Gill-openings wide, much wider than the orbit. *Pectorals falciform, extending beyond the end of the dorsal*, the length of their upper margin being nearly four times that of the lower. First dorsal commencing vertically above the middle of the lower edge of the pectoral. Origins of the second dorsal and anal opposite to each other, the former having a shorter base. Caudal fin long, with the upper edge undulated, longer than the distance between the two dorsal fins. Coloration uniform.

North Atlantic.

a. Head of a large example, in spirits, 18 inches long and 12 inches broad. Madeira. Presented by J. Y. Johnson, Esq.

b. Fine specimen, 36 inches long. Madeira. Presented by the Rev. R. T. Lowe.

c. Stuffed, 40 inches long. Madeira. Presented by the Rev. R. T. Lowe.

d. Fine specimen. St. Helena. Presented by J. C. Melliss, Esq.

18. Carcharias sorrah.

Carcharias (Prionodon) sorrah, *Müll. & Henle*, p. 45, taf. 16; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 39; *Duméril, Elasmobr.* p. 368.
Isoplagiodon sorrah, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 410.

Snout somewhat produced, the distance between its extremity and the mouth being equal to the width of the latter. Nostrils midway between the mouth and the extremity of the snout. Teeth $\frac{25}{25}$, those of the upper jaw oblique, serrated, with a notch in the outer margin; the lower smaller, narrower, slightly oblique, serrated. Gill-openings narrow, about as wide as the orbit. Pectorals falciform, extending to the end of the dorsal, *the length of their lower margin being two-sevenths of that of the upper.* Origin of the first dorsal at a very short distance from the base of the pectorals, its end much more distant from the ventral. The second dorsal small, smaller than the anal. Lower lobe of the caudal and pectorals with blackish extremities. First dorsal without black at the top.

Indian seas.

a. Stuffed, 31 inches long. From the Collection of the Zoological Society.
b. Fine specimen. From Dr. Bleeker's Collection.
c. Fœtus. Borneo. Purchased of Hr. Frank.

19. Carcharias dussumieri.

Carcharias (Prionodon) dussumieri, *Müll. & Henle*, p. 47, pl. 19. fig. 8; *Duméril, Elasmobr.* p. 370.
—— (——) javanicus, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 38; *Duméril, l. c.* p. 369.

Snout somewhat produced, the distance between its extremity and the mouth being equal to the width of the latter. Nostrils midway between the mouth and the extremity of the snout. Teeth $\frac{25}{26}$, those of the upper jaw oblique, serrated, with a notch in the outer margin; the lower smaller, narrow, slightly oblique, serrated, on a broad base. Gill-openings rather wider than the orbit. Pectorals falciform, extending to the end of the dorsal, *the length of their lower margin being two-fifths of that of the upper.* Origin of the first dorsal at a short distance from the base of the pectorals, its end more distant from the ventral. The second dorsal not much smaller than the anal. Fins with the margins whitish.

East-Indian archipelago.

a. Type of *C. javanicus*. Batavia. From Dr. Bleeker's Collection.

20. Carcharias gangeticus.

Carcharias (Prionodon) gangeticus, *Müll. & Henle*, p. 39, pl. 13; *Duméril, Elasmobr.* p. 359.
? Carcharias (Prionodon) japonicus, *Schleg. Faun. Japon. Poiss.* p. 302, pl. 133.

Snout very short and obtuse; nostrils very close to the extremity of the snout. Teeth $\frac{27\text{-}30}{27\text{-}30}$, the upper triangular, their outer edge with a slight trace of a notch; the lower teeth denticulated like the upper, erect, narrow, with broad base. Pectoral fin elongate, falciform, but shorter than in *C. lamia*. The first dorsal commences immediately behind the base of the pectoral, and has the anterior margin not convex.

Ganges; Feejee Islands; ? Japan.

a. Stuffed, 32 inches long. Calcutta. Presented by E. Blyth, Esq.
b. Stuffed, 30 inches long. In fresh waters of the island of Viti-Levu. Presented by F. M. Rayner, Esq.

The specific distinctness of *Carcharias* (*Prionodon*) *leucas,* M. & H. p. 42; Duméril, *l. c.* p. 358, from the West Indies, is not evident from the descriptions. According to that given by Müller and Henle, *C. leucas* would appear to have the shorter snout, whilst Duméril describes that of *C. gangeticus* as "très court et mousse." Our examples agree perfectly with Müller and Henle's description of *C. leucas* (except in colour, which is said to be whitish), yet specimen *a* is from the Ganges, and evidently identical with *C. gangeticus,* the original description of which only partially applies to it. Such difficulties of determination are the inevitable consequence as soon as the species are unduly multiplied, as is the case in the genus *Carcharias.*

21. **Carcharias amblyrhynchus.**

Carcharias (Prionodon) amblyrhynchus, *Bleek. Nat. Tyds. Ned. Ind.* x. p. 467.

Rostro acuto, parte præorali rictus longitudine paulo, rictus latitudine multo breviore; naribus rostri apici multo magis quam angulo oris approximatis; dentibus maxilla superiore triangularibus parum obliquis, totis denticulatis basi latis, basi externe processu denticulis majoribus serrato; dentibus maxilla inferiore gracilibus rectis denticulatis basi latis. Dorsali prima pectoralibus multo magis quam ventralibus approximata; dorsali secunda quintuplo circiter ejus longitudinis a dorsali prima remota, dorsali prima triplo circiter humiliore et breviore, longiore quam alta, anali tota opposita. Pectoralibus capite vix longioribus, $5\frac{3}{5}$ circiter in longitudine corporis, paulo minus duplo longioribus quam latis, emarginatis, acutis; anali medio basin caudalis inter et ventrales sita, dorsali secunda multo altiore sed vix latiore. Caudali 4 fere in longitudine corporis. Pectoralibus inferne albis apice nigricantibus; ventralibus caudalique nigricante marginatis. (*Blkr.*)

Java.

22. **Carcharias fasciatus.**

Carcharias (Prionodon) fasciatus, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 510, or *Verh. Bat. Gen.* xxiv. *Plag.* p. 37.

Rostro valde obtuso antice semicirculariter rotundato, latitudine rictus paulo breviore; parte præorali rictus latitudine plus duplo breviore, $1\frac{1}{2}$ in rictus longitudine; naribus rostri apici plus duplo quam angulo oris approximatis, valvula trigona valde conspicua; rictu valde curvato, multo latiore quam longo. Dentibus utraque maxilla æqualibus trigonis, obliquis, latis, totis denticulatis, basi externa processu serrato. Pinna dorsali prima pinnis pectoralibus multo magis quam ventralibus approximata, corpore paulo humiliore, paulo altiore quam longa, apice acutiuscule rotundata, emarginata, postice acutissima. Dorsali secunda anali opposita, quadruplo circiter ejus longitudinis a pinna dorsali prima remota, dorsali prima plus duplo humiliore et breviore. Pectoralibus capite multo brevioribus, emarginatis, apice acute rotundatis, latitudine basi 3 fere in earum longitudine. Anali ventralibus plus quam caudali approximata, dorsali secunda altiore sed non longiore, valde emarginata, apice acuta, postice acutissima. Caudali 3¼ circiter in longitudine corporis. Colore corpore superne griseo-cæruleo fasciis numerosis transversis diffusis et maculis fascias similantibus profundioribus; ventre albescente; pinnis cæruleo-griseis cærulescente nebulatis. (*Blkr.*)

Java.

23. Carcharias brachyurus.

?? Carcharias leucas, *Bennett, Proc. Zool. Soc.* 1859, p. 223.

Snout rather pointed, of moderate length, the distance between its end and the mouth being more than the length of the mouth, and about two-thirds of its width. Nostrils much nearer to the mouth than to the end of the snout, but nearer to the end of the snout than to the angle of the mouth. Teeth in the upper jaw oblique, serrated on both margins, and with a deep notch on the outer margin; teeth of the lower jaw narrow, erect, lanceolate, serrated, on a broad, two-rooted base. Gill-openings at least twice as wide as the eye. Pectoral fins narrow, pointed, falciform, the length of their inner margin being one-fourth of that of the outer. Dorsal fin rather nearer to the pectorals than to the ventrals, its distance from the pectorals being but little less than the length of its base. The second dorsal very small, shorter and lower than the anal. Origin of the anal opposite to that of the second dorsal, and midway between the ventral and caudal. The length of the caudal is one-fourth of the total. Coloration uniform.

New Zealand.

a. Stuffed, 7¾ feet long. Antarctic Expedition.
b. Stuffed, 44 inches long. New Zealand. Presented by Sir J. Ross.
c, *d*. Fœtus. Australia.

Squalus tiburo, Poey, Mem. Cub. ii. p. 331, and Repert. Fis.-nat. Cuba, 1868, p. 448, = *Squalus acronotus*, Poey, *l. c.* p. 335, from Cuba, appears to be very closely allied to *C. brachyurus*; but it is probable that specific differences will be found when examples from both localities can be compared.

24. Carcharias melanopterus.

Carcharias melanopterus, *Quoy & Gaim. Voy. Uran. Zool.* p. 194, pl. 43. figs. 1 & 2; *Rüpp. N. W. Fisch.* p. 63.

Carcharias (Prionodon) melanopterus, *Müll. & Henle*, p. 43, pl. 19. fig. 5; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 33; *Duméril, Elasmobr.* p. 365.
—— (Prionace) melanopterus, *Cant. Mal. Fish.* p. 400.
—— (Prionodon) henlei, *Bleek. Nat. Tyds. Ned. Ind.* iv. p. 507.
—— (——) brachyrhynchus, *Bleek. Act. Soc. Sc. Indo-Neerl.* vi. p. 206; *Duméril, Elasmobr.* p. 364.

Snout short and obtuse, the nostrils being nearer to its extremity than to the mouth. Teeth $\frac{25-31}{25-31}$, the upper oblique, with the inner margin straight and the outer notched; the lower narrower; both serrated. Pectoral fin falciform, the upper margin being thrice as long as the lower, extending to the end of the dorsal. The first dorsal is only a little nearer to the root of the pectoral than to that of the ventral. Second dorsal opposite to the anal, to which it is similar in size and shape. *Extremities of all the fins deep black.*

Indian Ocean and archipelago.

a. Stuffed, 33 inches long. South Africa. Presented by Sir A. Smith.
b. Fine specimen. Amboyna. Purchased of Hr. Frank.
c. Fine specimen. Amboyna. Purchased of Hr. Frank. (*C. brachyrhynchus.*)
d. Young. Amboyna. From Dr. Bleeker's Collection.

25. **Carcharias bleekeri.**

? Squalus spallanzanii, *Péron & Les. Journ. Ac. Nat. Sc. Philad.* ii. p. 351.
Carcharias (Prionodon) bleekeri, *Duméril, Elasmobr.* p. 367.

Snout moderately produced, the nostrils being midway between its extremity and the mouth. Teeth $\frac{25}{23}$, the upper oblique, with the inner margin straight and the outer notched; the lower nearly erect, narrow, on a broad base; both finely serrated. Pectoral fins falciform, *the upper margin being five times as long as the lower.* Origin of the dorsal fin at a short distance behind the inner posterior angle of the pectoral. Second dorsal opposite to, as long as, but lower than, the anal, and produced in a long lobe posteriorly. *A deep-black spot on the lower side of the extremity of the pectoral fin; extremity of the lower caudal lobe with a deep-black spot. No spot on the first dorsal fin.*

Indian Ocean.

a. Half-grown: male. Seychelles. Presented by Lieut.-Col. Playfair.

26. **Carcharias albomarginatus.**

Carcharias albomarginatus, *Rüpp. N. W. Fische*, p. 64, taf. 18. fig. 1.
—— (Prionodon) albomarginatus, *Müll. & Henle*, p. 44; *Duméril, Elasmobr.* p. 366.

Snout rather short and obtuse, the nostrils being somewhat nearer to the mouth than to the extremity of the snout. Teeth $\frac{25-27}{25-27}$; the upper oblique, serrated, with the outer margin notched; the lower somewhat narrower, erect. Pectoral fin falciform, extending to the end of the dorsal. The first dorsal is only a little nearer to the root of the pectoral than to that of the ventral. Second dorsal one-third the size of the first. *Extremities and outer margin of all the fins of a pure milky white.*

Red Sea.

27. Carcharias menisorrah.

Carcharias (Prionodon) menisorrah, *Müll. & Henle*, p. 46, pl. 17; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 35, pl. 1. fig. 3; *Duméril, Elasmobr.* p. 369.

—— (——) tjutjot, *Bleek. l. c.* p. 36, pl. 1. fig. 4; *Duméril, l. c.* p. 371.

Snout obtusely rounded, rather produced, the distance between its extremity and the mouth being somewhat less than the width of the latter. Nostrils rather nearer to the extremity of the snout than to the mouth. Teeth $\frac{27-28}{27-28}$, the upper oblique, distinctly serrated, with a notch in the outer margin; *the lower narrow, lanceolate, not serrated,* on a broad base. Gill-openings somewhat wider than the orbit. Pectorals extending to the end of the dorsal, the length of their upper margin being nearly thrice that of the lower. First dorsal nearer to the base of the pectorals than to that of the ventrals, its origin being opposite to the lower angle of the pectoral. The second dorsal is, as regards size and form, similar, and entirely opposite to the anal; it is about one-third the size of the first dorsal. Coloration uniform, fins with the margins whitish.

Indian Seas.

a. Fine specimen. Moluccas. From Dr. Bleeker's Collection.
b. Type of *C. tjutjot.* Batavia. From Dr. Bleeker's Collection.
c. Stuffed, 28 inches long. Moluccas.
d. Jaws of a large example (12 inches wide).

28. Carcharias borneensis.

Carcharias (Prionodon) borneensis, *Bleek. Act. Soc. Sc. Indo-Neerl.* v. *Borneo*, xii. p. 8.

Rostro antice acutiuscule rotundato, rictus latitudine longiore, parte præorali rictus longitudine longiore; naribus rostri apici magis quam angulo oris approximatis, oculo minoribus, valvula trigona valde conspicua; rictu valde curvato latiore quam longo; dentibus maxilla superiore oblique trigonis postrorsum spectantibus margine anteriore leviter denticulatis, margine posteriore edentulis, sed basi processu bi- ad tridentato munitis; dentibus maxilla inferiore basi lata insertis oblique trigonis postrorsum spectantibus *denticulis conspicuis nullis*, oblique basi lata non dentata insertis. Pinna dorsali prima pectoralibus magis quam ventralibus approximata; dorsali secunda magna parte post pinnam analem sita, plus quintuplo ejus longitudinis a pinna dorsali prima remota, basi longiore quam antice alta, dorsali prima triplo circiter humiliore. Pectoralibus $1\frac{2}{3}$ circiter in longitudine capitis, latitudine $1\frac{1}{3}$ circiter in earum longitudine, emarginatis, apice acute rotundatis. Anali caudali magis quam ventralibus approximata, dorsali secunda vix latiore et non altiore. Caudali $3\frac{2}{3}$ ad $3\frac{3}{4}$ in longitudine corporis, lobo posteriore oblique emarginato, lobo anteriore lobo posteriore plus duplo longiore, $5\frac{1}{3}$ circiter in longitudine corporis. Pinnis cærulescente-griseis, dorsalibus antice nigro marginatis, dorsali prima superne tota fere nigra; caudali postice tota nigro marginata. (*Blkr.*)

Borneo.

29. **Carcharias amboinensis.**

Carcharias (Prionodon) amboinensis, *Müll. & Henle*, p. 40, taf. 19. fig. 4.

Snout obtusely rounded. Teeth of moderate size, $\frac{25}{25}$, triangular, scarcely oblique, serrated, *subequal in size and form in both jaws.* The first dorsal commences immediately behind the base of the pectoral. (*M. & H.*)

Amboyna.

The specimens described by Bleeker (Verh. Bat. Gen. xxiv. Plag. p. 41, and Nat. Tyds. Ned. Ind. vi. p. 507) and by Duméril (Elasmobr. p. 361, from a drawing!) cannot belong to the species described by Müller and Henle. We have received one of them from Dr. Bleeker; it is a new-born individual, in which the teeth of the lower jaw have the narrow lanceolate shape, as found in *C. lamia*, being very different from those of *C. amboinensis*. I cannot refer this example with certainty to any of the species named by Müller and Henle.

a. Eighteen inches long. Amboyna. From Dr. Bleeker's Collection as *C. amboinensis*.

30. **Carcharias lamia.**

Squalus, sp., *Gronov. Zoophyl.* no. 143.
Squalus carcharias, *Risso, Ichth. Nice*, p. 25.
Carcharias (Prionodon) lamia, *Risso, Eur. Mér.* iii. p. 119; *Müll. & Henle*, p. 37, pl. 12; *Duméril, Elasmobr.* p. 356; *Bocage & Capello, Peix. Plagiost.* p. 18.
Squalus carcharias, *Gronov. Syst.* ed. *Gray*, p. 5.
Squalus longimanus, *Poey, Mem. Cub.* ii. p. 338, pl. 19. figs. 9 & 10 (teeth).
Eulamia longimana, *Poey, Repert. Fis.-nat. Cub.* 1868, p. 448.

Snout of moderate length, rounded, the distance between the mouth and the extremity of the snout being equal to the distance between the inner angles of the nostrils. No labial fold, beside a groove at the angle of the mouth. Teeth of moderate size, $\frac{27-31}{27-30}$; the upper regularly triangular, without notch on the posterior margin, both margins being distinctly serrated. Lower teeth narrowed, with a broad, two-rooted base, very finely serrated on both margins. Pectoral fin very large and long, extending in young examples beyond the dorsal, and in adult nearly to its end. The first dorsal large and high, its depth being equal to the depth of the body. The second dorsal is smaller than the anal, only about one-sixth the size of the first. The first dorsal commences at a very short distance behind the root of the pectoral. Eyes small. Gill-openings rather narrow.

Mediterranean; Atlantic.

a–c. Stuffed, 6–7 feet long.
d–g. Stuffed, 20 inches long.
h. Young: skin. From Gronow's Collection.
i. A great number of jaws, the largest 12 inches wide.

31. **Carcharias glyphis.**

Carcharias (Prionodon) glyphis, *Müll. & Henle*, p. 40, pl. 14.

Snout short, rather obtuse, the distance between the mouth and the extremity of the snout being equal to the distance between the inner angles of the nostrils. Teeth of moderate size, $\frac{27}{27}$, the upper serrated, triangular, very slightly oblique. Lower teeth narrow, with a two-rooted base, very finely serrated; *those in front are subcylindrical, with a lanceolate point, chisel-shaped.* Pectoral fin shorter than in *C. lamia.* The first dorsal commences immediately behind the base of the pectoral. The second dorsal rather larger than the anal. Eyes small. (*M. & H.*)

Habitat ——?

32. **Carcharias limbatus.**

Carcharias (Prionodon) limbatus, *Müll. & Henle*, p. 49, taf. 19. fig. 9 (teeth); *Duméril, Elasmobr.* p. 375.
Carcharias microps, *Lowe, Proc. Zool. Soc.* 1840, p. 38, 1843, p. 93; *Trans. Zool. Soc.* iii. p. 18.
? Prionodon cucuri, *Casteln. An. Am. Sud, Poiss.* p. 99.
Isogomphodon maculipinnis, *Poey, Repert. Fis.-nat.* i. p. 191, tab. 4. figs. 2 & 3, ii. p. 245, tab. 2. figs. 1–3.
Carcharias maculipinnis, *Günth. Trans. Zool. Soc.* vi. p. 490.
—— (Prionodon) mülleri, *Steindachner, Sitzgsber. Ak. Wiss. Wien*, 1867, lvi. p. 356.

Snout somewhat pointed in front, rather produced, the distance between its extremity and the mouth being somewhat less than the width of the mouth. Nostrils nearly midway between the extremity of the snout and the mouth. Teeth $\frac{25-29}{27-30}$, *similar in form in both jaws*, namely erect, constricted, on a broad base, the upper more distinctly serrated than the lower. Gill-openings wide, at least twice as wide as the eye, which is small. Pectorals falciform, extending beyond the end of the dorsal, the length of their upper margin being nearly four times that of the lower. First dorsal commencing very close behind the axil of the pectoral. Origins of the second dorsal and anal opposite to each other, the bases of both being nearly equally long. Caudal fin long, with the upper edge slightly undulated, its length being equal to the distance between the origins of the two dorsal fins. The lower side of the extremity of the pectoral, and the extremities of the second dorsal and anal and of the lower caudal lobe, black.

Tropical parts of the Atlantic; Pacific coast of Central America; Indian Ocean.

a. Fine specimen. Cape Verde Islands. Presented by the Rev. R. T. Lowe.

b. Stuffed, 4 feet long. Chiapam. From Mr. Salvin's Collection.

c, d–e. Fine specimens. Seychelles. From Prof. E. P. Wright's Collection.

f. Stuffed. Indian Ocean. Presented by T. E. J. Boileau, Esq.

g. Jaws of a large example.

33. **Carcharias pleurotænia.**

Carcharias (Prionodon) pleurotænia, *Bleek. Verh. Bat. Gen.* xxiv *Plag.* p. 40, tab. 2. fig. 6.

Snout somewhat pointed in front, rather produced, the distance between its extremity and the mouth being very little less than the width of the mouth. Nostrils rather nearer to the mouth than to the extremity of the snout. Teeth $\frac{29}{30}$, *similar in form in both jaws*, namely erect, constricted, on a broad base, the upper serrated, the lower smooth. Gill-openings wide, about thrice as wide as the eye, which is small. Pectorals falciform, extending beyond the end of the dorsal, the length of their lower margin being two-sevenths of that of the upper. First dorsal commencing very close behind the axil of the pectoral. Origins of the second dorsal and anal opposite to each other, the bases of both being nearly equally long. Caudal fin long, with the upper edge slightly undulated, its length being rather less than the distance between the origins of the two dorsal fins. Sides of the tail with a longitudinal light band tapering in front. Fins without black spots.

East Indian archipelago.

a. Type of the species. Batavia. From Dr. Bleeker's Collection.

34. **Carcharias temminckii.**

Carcharias (Prionodon) temminckii, *Müll. & Henle*, p. 48, pl. 18.
Lamiopsis temminckii, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 410 (name only).

Snout somewhat pointed in front, rather produced, the distance between its extremity and the mouth being a little less than the width of the latter. Nostrils nearer to the mouth than to the end of the snout. Teeth $\frac{36-38}{38-40}$: the upper erect, rather narrow, without a broad base, minutely serrated; the lower awl-shaped, with a broad base, not serrated. The teeth near the angle of the mouth are very small. Gill-openings wide, much wider than the small eye. Pectorals very broad, extending to below the middle of the dorsal; their lower margin is more than one-third of the length of the upper. The first dorsal is midway between the roots of the pectoral and ventral fins. *The second dorsal is but little smaller than the first*, and opposite to the anal. Coloration uniform.

India.

a. Stuffed, 43 inches long. From the Collection of the Zoological Society.—One of the typical specimens.
b. Stuffed, 24 inches long. Calcutta.

35. Carcharias oxyrhynchus.

Carcharias (Prionodon) oxyrhynchus, *Müll. & Henle*, p. 41, pl. 15; *Duméril, Elasmobr.* p. 356.
Isogomphodon oxyrhynchus, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 410 (name only).

Snout very much elongate, pointed, narrow; the distance between the mouth and extremity of the snout is about twice the distance between the nostrils. A short labial fold on the upper and lower jaws, proceeding from the angle of the mouth. Teeth small, $\frac{46-49}{46-49}$, erect, rather slenderer in the lower jaw than in the upper; only the upper teeth show a very fine serrature near the apex. Pectoral fin very large and broad, extending beyond the dorsal, which commences vertically above the root of the pectoral. The second dorsal and anal subequal in size and form, only about half the size of the first dorsal. Eye small; gill-openings of moderate width.

Atlantic coasts of Tropical South America.

a. Stuffed, 43 inches long.

2. HEMIGALEUS.

Hemigaleus, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 45.
Hemigaleus *et* Chænogaleus, *Gill.*

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a single notch. A pit on the tail, above and below, before the commencement of the caudal fin. Membrana nictitans present. A minute pore-like spiracle* behind the eye. Mouth crescent-shaped, with labial folds. Only the teeth of the upper jaw with denticulations.

East-Indian archipelago.

The two species of this genus may easily be confounded with those referred to "*Hypoprion*," to which, indeed, they are most closely allied, although referred to different families in some of the recent artificial arrangements. They may be distinguished, more easily than by the presence or absence of the rudimentary spiracle, by the greater development of the labial folds, which in *Hypoprion* are reduced to an extremely short impression at the angle of the mouth.

1. Hemigaleus microstoma.

Bleek. Verh. Bat. Gen. xxiv. *Plag.* p. 46, pl. 2. fig. 9; *Duméril, Elasmobr.* p. 392.

Spiracle minute, not larger than other pores. Length of the præoral portion of the snout rather more than the width of the mouth.

---

* I could not convince myself that the canal communicates with the pharynx.

A short labial fold on both jaws. Teeth $\frac{32}{41}$, the upper oblique, serrated on the outer margin only: the lower much smaller, erect, narrow, on a broad base, not serrated. Gill-openings wider than the orbit. Pectoral fin pointed, falciform, extending to below the middle of the dorsal. Second dorsal two-thirds the size of the first, and much larger than the anal. Length of the caudal equal to the distance between the two dorsals.

Java, Amboyna.

a. One of the typical specimens. From Dr. Bleeker's Collection.

2. Hemigaleus macrostoma.

Hemigaleus macrostoma, *Bleek. l. c.* fig. 10; *Duméril, l. c.*
Chænogaleus macrostoma, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 411 (name only).

Spiracle somewhat larger than other pores. Length of the præoral portion of the snout equal to the width of the mouth. A short labial fold on both jaws. Teeth $\frac{34}{34}$; the upper oblique, rather narrow, with several coarse denticulations on the outer side of the base; the lower not serrated, still narrower, slightly oblique, the anterior erect. Gill-openings wide, much wider than the orbit. Pectoral fin somewhat pointed, extending beyond the middle of the dorsal fin. Second dorsal fin two-thirds the size of the first, and much larger than the anal. Length of the caudal fin equal to the distance between the two dorsals.

Java.

a. One of the typical specimens. From Dr. Bleeker's Collection.

3. LOXODON.

Loxodon, *Müll. & Henle*, p. 61.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a single notch. A pit on the tail, above and below, at the commencement of the caudal fin. Membrana nictitans present; pupil of the eye rounded. A minute spiracle behind the eye. Mouth crescent-shaped. Teeth subequal in both jaws, oblique, with a notch on the outer margin, without serrature or denticulations.

Indian Ocean.

1. Loxodon macrorhinus.

Müll. & Henle, p. 61, pl. 25.

Snout long, the length of the præoral portion being considerably more than the width of the mouth. Nostrils much nearer to the mouth than to the end of the snout. A very short labial fold round the angle of the mouth. Teeth $\frac{25}{25}$. The first dorsal fin rather nearer to the root of the ventrals than to that of the pectorals. The second dorsal fin very small, only half as long as, and situated entirely behind, the anal. Caudal fin long, nearly one-third of the total length.

Indian Ocean.

a–b. Young, 14 inches long. Seychelles. From Prof. E. P. Wright's Collection.

Very closely allied to *Carcharias glaucus*.

4. GALEOCERDO.

Galeocerdo, *Müller & Henle*, p. 59.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a double notch. A pit on the tail, above and below, at the commencement of the caudal fin. Membrana nictitans present; pupil of the eye rounded. Small spiracles. Mouth crescent-shaped. Teeth subequal in both jaws, oblique, serrated on both margins, with a deep notch on the outer margin.

Arctic, temperate, and tropical seas.

1. Galeocerdo arcticus.

Squalus arcticus, *Faber, Fisch. Isl.* p. 17; *Nilss. Skand. Faun. Fisk.* p. 717; *Kröyer, Danm. Fisk.* p. 933.

Galeocerdo arcticus, *Müll. & Henle*, p. 60, pl. 24; *Duméril, Elasmobr.* p. 394.

Boreogaleus arcticus, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 411.

Teeth: *Hérissant, Ac. Sc.* 1749, p. 158, pl. 9; *Lacép.* i. pl. 8. fig. 4; *Blake, Dent. Form. et Struct.* tab. 6. fig. 5; *Agass. Poiss. Foss.* tab. E. figs. 5 & 6 (Galeus cepedianus); *Owen, Odontogr.* tab. 28. fig. 9 (Galeus).

The length of the caudal fin is one-fourth of the total, and equal to the distance between the two dorsal fins. The length of the præoral part of the snout is much less than the distance between the inner angles of the nostrils. A labial fold along a part of the upper jaw. Second dorsal fin scarcely in advance of the anal. Coloration uniform.

Arctic seas.

a. Stuffed, 10½ feet long. From the Haslar Collection.
b–d. Jaws of very large examples.

2. Galeocerdo rayneri.

Galeocerdo tigrinus, *Gray, Chondropt.* p. 54.

—— rayneri, *MacDonald & Barron, Proc. Zool. Soc.* 1868, p. 368, pl. 32 (not good).

The length of the caudal fin is a little more than one-fourth of the total, and not quite equal to the distance between the two dorsal fins. The length of the præoral part of the snout is much less than the distance between the inner angles of the nostrils. A long labial fold along the upper jaw. Body with some obscure spots and vertical stripes.

Indian and Australian seas.

a. Stuffed, 7½ feet long. India. Presented by T. C. Jerdon, Esq.

3. Galeocerdo tigrinus.

?Galeus maculatus, *Ranzani, Nov. Comm. Ac. Bonon.* iv. 1840, p. 68, pl. 8.
Galeocerdo tigrinus, *Müll. & Henle*, p. 59, pl. 23; *Gill, Proc. Ac. Nat. Sc. Phil.* 1864, p. 263; *Duméril, Elasmobr.* p. 393.
—— maculatus, *Poey, Repert. Fis.-nat. Cuba*, 1868, p. 453.

The length of the caudal fin is about one-third of the total, and much more than the distance between the two dorsal fins. The length of the præoral part of the snout is less than the distance between the inner angles of the nostrils. A long labial fold along the upper jaw. Second dorsal fin somewhat in advance of the anal. Body with numerous dark-brown spots larger than the eye.

Indian seas; Atlantic.

a. Thirty-nine inches long. Japan. Purchased of Mr. Jamrach.
b. Fœtus. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
c. Stuffed, 31 inches long. Purchased.

5. THALASSORHINUS.

Thalassorhinus, *Müll. & Henle*, p. 62.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a single notch. A pit on the tail, above and below, at the commencement of the caudal fin. Membrana nictitans present. Pupil of the eye vertical. Spiracles of moderate size. Mouth crescent-shaped. Teeth serrated in both jaws.

Mediterranean and Atlantic.

1. Thalassorhinus vulpecula.

? Carcharias rondeletii, *Risso, Ichth. Nice*, p. 27; *Eur. Mérid.* iii. p. 120.
Thalassorhinus vulpecula, *Müll. & Henle*, p. 62.

Snout pointed, of moderate length; nostrils midway between the end of the snout and the mouth. Spiracle half as large as the eye, its distance from the eye being equal to the diameter of the latter. Teeth $\frac{26}{26}$; the upper somewhat oblique, the lower with a finer serrature and more erect. First dorsal fin somewhat nearer to the ventrals than to the pectorals. Anal fin as large as and opposite to the second dorsal. Pectoral fin narrow, pointed, falciform. Coloration uniform. (*M. & H.*)

Atlantic and Mediterranean.

2. Thalassorhinus platyrhynchus.

Walbaum, Schrift. Ges. ntrf. Freund. Berlin, v. p. 381.
Squalus platyrhynchus, *Walbaum, Artedi*, p. 521.
Thalassorhinus platyrhynchus, *Müll. & Henle*, p. 63.

Snout short and broad, with a sharpish edge.
Hab. —— ?

This fish has not been recognized, and the typical example appears to be lost.

6. GALEUS.

Galeus, *Cuv. Règne An.*

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a single notch. No pit at the commencement of the caudal fin. Membrana nictitans and small spiracles present. Mouth crescent-shaped. Teeth equal in both jaws, oblique, with notch and serrature.

Temperate and tropical seas.

1. Galeus canis.

The Tope.
Galeus canis, *Rondel. De Pisc.* p. 377.
Canis galeus, *Salvian.* p. 130, fig. 41; *Willughby, Hist. Pisc.* p. 51, pl. B 6. fig. 1.
Squalus, sp., *Artedi, Gen.* p. 68. no. 9; *Synon.* p. 97.
Squalus galeus, *L. Syst. Nat.* i. p. 399; *Brünn. Pisc. Massil.* p. 9; *Bl.* p. 118; *Bl. Schn.* p. 128; *Risso, Ichth. Nice*, p. 32; *Turt. Brit. Faun.* p. 112; *Jenyns, Man.* p. 501; *Nilss. Skand. Faun. Fisk.* p. 714; *Couch, Fish. Brit. Isl.* i. p. 45, pl. 9.
Milandre, *Duham. Pesch.* ii. pl. 20. figs. 1 & 2; *Lacép.* i. p. 237.
Tope, *Penn. Brit. Zool.* iii. p. 98, or, edit. 1812, iii. p. 146 (not pl. 18).
Carcharias galeus, *Risso, Eur. Mérid.* iii. p. 121.
Galeus vulgaris, *Flem. Brit. An.* p. 165; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 509, or 3rd edit. ii. p. 491; *Parnell, Werner. Mem.* vii. p. 414; *Kröyer, Danm. Fisk.* iii. p. 834.
—— canis, *Bonap. Faun. Ital. Pesce*; *Müll. & Henle*, p. 57; *Gaimard, Voy. Isl. et Groenl. Poiss.* pl. 21, *Wright & Ekstr. Skand. Fisk.* p. 185, pl. 45; *Duméril, Elasmobr.* p. 390; *Bocage & Capello, Peix. Plagiost.* p. 18.
—— communis, *Owen, Osteol. Catal.* i. p. 92.

Spiracle small. A short labial fold on both jaws. Teeth $\frac{3\,4}{3\,1}$. The second dorsal fin is only one-third of the size of the first, and somewhat in advance of the anal. Length of the tail nearly equal to the distance between the two dorsals. Vert. 140.

Temperate and tropical seas.

a–d. Stuffed, from 4 to 5½ feet long. English coast.
e. Young: stuffed. Southend.
f. Young. Firth of Forth. From Leach's Museum.
g–h. Jaws of large examples. Polperro.
i. Fine adult specimen. Mediterranean. Purchased of Mr. Cutter.
k. Half-grown: stuffed. Cape seas.

l. Stuffed, 41 inches long. Indian Ocean.
m. Stuffed, 5½ feet long. Antarctic Ocean.
n. Young. Tasmania. Purchased of Hr. Schwarzschild.
o. Young. San Francisco. From Mr. Gruber's Collection.

2. **Galeus japonicus.**

Müll. & Henle, p. 58, pl. 22.

Spiracle small. A short labial fold on both jaws. The second dorsal fin is not much smaller than the first, and slightly in advance of the anal. Length of the caudal fin rather less than the distance between the two dorsals. (*M. & H.*)

Japan.

Group B. ZYGÆNINA.

7. ZYGÆNA.

Cestracion, *Klein, Pisc. Miss.* iii. p. 12.
Cestrorhinus, *Blainville, Prodr.* p. 121.
Zygæna, *Cuv. Règne Anim.*
Sphyrna, (*Rafin.*) *Müll. & Henle.*
Eusphyra *et* Reniceps, *Gill, Ann. Lyc. Nat. Hist. New York*, viii. p. 412.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. Caudal fin with a single notch. A pit at the commencement of the caudal fin. Anterior part of the head broad, flattened and laterally elongated. Eyes situated at the extremity of the lobes, with a membrana nictitans. Spiracles none. Nostrils situated on the front edge of the head. Mouth crescent-shaped. Teeth of both jaws similar, oblique, with notch.

Temperate and tropical seas.

1. **Zygæna blochii.**

Zygæna blochii, *Cuv. Règne An.*; *Valenc. Mém. Mus.* ix. p. 227, pl. 11. fig. 2; *Benn. Life of Raffles*, p. 694; *Cantor, Quart. Med. Journ. Calcutta*, 1837, and *Trans. Med. & Phys. Soc. Calcutta*, viii. 2. *Append.* p. ccxi, or in *Ann. & Mag. Nat. Hist.* 1845, xvi. p. 372.
—— laticeps, *Cant. Quart. Med. Journ. Calcutta*, 1837, pls. 1–3 (young).
Sphyrna blochii, *Müll. & Henle*, pp. 54, 199; *Bleek. Verh. Bat. Gen.* xxii. p. 6, and xxiv. *Plag.* p. 41, pl. 3. fig. 7; *Cant. Mal. Fish.* p. 404.
Cestracion blochii, *Duméril, Elasmobr.* p. 383.

The two lobes of the head very long, each being nearly thrice as long as broad. The nostril is much nearer to the mouth than to the eye, a deep groove running along the anterior edge of each lobe.

East-Indian archipelago.

a. Stuffed, 4 feet long. Calcutta. From Dr. Evans's Collection.
b, *c*. Young. Singapore.

d. Head of an adult example. India. Presented by General Hardwicke.
e. Young. Pinang. From Dr. Cantor's Collection.
f–g. Half-grown and young: stuffed. Pinang. From Dr. Cantor's Collection.
h. Half-grown: dried. Coast of Malabar.

2. Zygæna malleus.

Libella, *Bellon. De Aquat.* p. 61; *Salvian*, p. 128, tab. 40; *Aldrov.* p. 408; *Jonston*, tab. 7. fig. 8; *Willughby*, pl. B 1.
Zygæna, *Rondel.* p. 389; *Gesner, De Aquat.* p. 1050.
Squalus, sp., *Artedi, Gen.* p. 44. no. 7; *Synon.* p. 96. no. 7; *Gronov. Mus. Ichth.* i. pp. 63, 139; *Zoophyl.* p. 146.
Zygène, *Dutertre, Hist. Nat.* ii. p. 207; *Duhamel, Pesches*, ii. sect. ix. pl. 21. figs. 3–8.
Squalus zygæna, *L. Syst. Nat.* p. 399; *Bl.* tab. 117; *Bl. Schn.* p. 131; *Lacép.* i. p. 257; *Brünn. Pisc. Mass.* p. 4; *Forsk. Descript. Anim.* p. xviii; *Mitch. Trans. Lit. & Phil. Soc. New York*, i. p. 284; *Gronov. Syst.* ed. *Gray*, p. 6.
Cestracion, sp. no. 1, *Klein, Pisc. Miss.* iii. p. 13.
Cornuda, *Parra*, lam. 32.
Koma sorra, *Russell*, pl. 12.
Squalus malleus, *Risso, Ichth. Nice*, p. 34.
Zygæna malleus, *Shaw, Nat. Misc.* pl. 267; *Val. Mém. Mus.* ix. 1832, p. 223, pl. 11. fig. 1; *Risso, Eur. Mérid.* iii. p. 125; *Cant. Quart. Med. Journ. Calcutta*, 1837, fig. 1; *Schleg. Faun. Japon. Poiss.* p. 306, pl. 138; *Jenyns, Man.* p. 507; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 504, or 3rd edit. ii. p. 486; *Dekay, New York Faun. Fish.* p. 362, pl. 62. fig. 204; *Storer, Proc. Bost. Soc. Nat. Hist.* i. p. 36; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 42, pl. 3. fig. 8; *Couch, Fish. Brit. Isl.* i. p. 70, pl. 16.
—— lewini, *Griff. An. Kingdom*, x. p. 640, pl. 50.
Sphyrna zygæna, *Müll. & Henle*, p. 51; *Bonap. Faun. Ital. Pesce*; *Cant. Mal. Fish.* p. 401; *Bocage & Capello, Peix. Plagiost.* p. 17.
Cestracion zygæna, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 403; *Duméril, Elasmobr.* p. 382; *Day, Fish. Malab.* p. 270.
—— leeuwenii, *Duméril, l. c.* p. 383.

The length of the hinder margin of one side of the hammer is nearly equal to its width near the eye. Nostril close to the eye, prolonged into a groove running along nearly the entire front margin of the head.

Tropical and subtropical seas.

a–b. Young. Mediterranean.
c. Young: stuffed. Mediterranean.
d–e. Half-grown. Madeira.
f. Young. West Africa. Presented by Lieut. Strickland.
g. Young. British Guyana. From Dr. Bancroft's Collection.
h. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
i–k. Half-grown. Seychelles. From Prof. E. P. Wright's Collection.
l. Young. Pinang. From Dr. Cantor's Collection.
m. Young. Moluccas.

n–o. Half-grown. Formosa. From Consul Swinhoe's Collection.
p. Young. Amoy. From Consul Swinhoe's Collection.
q, r. Half-grown and young. Japan. Purchased of Mr. Jamrach.
s. Stuffed, 51 inches long. South Australia. Purchased of Mr. Knight.
t. Half-grown: stuffed. Island of Totoya (Feejee Islands). Collected by F. M. Rayner, Esq.
u, v, w, x. Young and fœtus.
y–z. Half-grown: stuffed.
α. Jaw of a large example. From the Collection of the Zoological Society.
β. Jaws of a half-grown example.

3. **Zygæna tudes.**

Zygæna tudes, *Cuv. Règne An.*; *Valenc. Mém. Mus.* ix. p. 225, pl. 12. fig. 1.
Sphyrna tudes, *Müll. & Henle*, p. 53; *Müll. & Trosch. in Schomburgk, Brit. Guian.* iii. p. 642.
Cestracion tudes, *Duméril, Elasmobr.* p. 384.

Intermediate between *Z. malleus* and *Z. tiburo.*

Anterior margin of the head much curved, but not continuous with the lateral edge; the length of the hind margin of one side of the hammer is less than its width near the eye. Nostril close to the eye, prolonged into a groove running along the greater part of the front margin of the head.

Mediterranean; tropical parts of the Atlantic; Indian Ocean and archipelago.

a. Half-grown (32 inches): stuffed. West Indies. Purchased of Mr. Scrivener.
b. Young. Demerara. Presented by Sir R. Schomburgk.
c. Young: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.
d. Young. Sumatra. Purchased of Hr. Frank.
e–f. Young. From the Collection of Dr. van Lidth de Jeude.

4. **Zygæna tiburo.**

Tiburonis, species minor, *Pison. Hist. Nat. Bras.* p. 181; *Willughby*, p. 55, tab. B 9. no. 3.
Cestracion, no. 2, *Klein, Miss.* iii. p. 13, tab. 2. figs. 3 & 4.
Squalus tiburo, *L. Syst.* p. 399; *Bl. Schn.* p. 131; *Gronov. Syst.* ed. *Gray*, p. 6.
Heart-headed Shark, *Shaw, Gen. Zool.* v. 2. p. 355, pl. 154, and *Nat. Misc.* pl. 229.
Sphyrna tiburo, *Müll. & Henle*, p. 53.
Zygæna tiburo, *Valenc. Mém. Mus.* ix. p. 226, pl. 12. fig. 2.
? Zygæna subarcuata, *Storer, Proc. Bost. Soc. Nat. Hist.* 1848, p. 70.
Cestracion tiburo, *Duméril, Elasmobr.* p. 385.

The anterior and lateral margins of the head are confluent, forming a regular semicircle; the posterior margins of the sides of the hammer very short. Nostril close to the eye, with the groove indistinct.

Atlantic; China.

a. Young. New Orleans. Purchased of Mr. Cuming.
b. Young. Belize. From Mr. Godman's Collection.
c. Young. Atlantic.
d. Young. Bahia. From Dr. Wucherer's Collection.
e. Young. China. Presented by Sir J. Richardson.

5. Zygæna mokarran.

Zygæna mokarran, *Rüpp. N. W. Fisch.* p. 66, taf. 17. fig. 3.
Sphyrna mokarran, *Müll. & Henle*, p. 54.

Anterior margin of the head nearly straight, forming a right angle with the lateral. Length of the hind margin of one of the lobes of the hammer equal to its width near the eye. No incision above the nostril, which is close to the eye. No groove proceeding from the nostril along the front margin of the head. (*Rüpp.*)

Red Sea.

Group C. MUSTELINA.

8. TRIÆNODON.

Triænodon, sp., *Müll. & Henle*, p. 55.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. A pit at the commencement of the caudal. Lower caudal lobe distinct. Membrana nicticans present; spiracles none. Mouth crescent-shaped; a pit behind the angle of the mouth. Teeth small, numerous, equal in both jaws, each with a longer median cusp, and one or two small ones on each side.

Red Sea; Indian Ocean.

1. Triænodon obesus.

Carcharias obesus, *Rüpp. N. W. Fisch.* p. 64, pl. 18. fig. 2.
Triænodon obesus, *Müll. & Henle*, p. 55, pl. 20; *Duméril, Elasmobr.* p. 386.

Snout very short and obtuse. Front margin of the nostril with a short tentacle. The second dorsal is more than half the size of the first, opposite to and rather larger than the anal. First dorsal very close to the root of the ventral. Top of the dorsal and caudal fins white.

Red Sea; Indian Ocean; New Hebrides.

a. Young. Seychelles. Presented by Lieut.-Col. Playfair.
b. Head and tail of adult. Seychelles. Presented by Lieut.-Col. Playfair.
c. Fine specimen: stuffed. Aneiteum. Collected by Mr. M'Gillivray.

9. LEPTOCARCHARIAS.

Leptocarias, *Smith, MS.*

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. No pit at the root of the caudal; no lower caudal lobe. Membrana nictitans present. Spiracles none. Mouth crescent-shaped, with well-developed long labial folds. Teeth small, numerous, similar in both jaws, each with a longer median cusp and one or two small ones on each side.

South Africa.

1. Leptocarcharias smithii.

Triænodon smithii, *Müll. & Henle*, p. 56, pl. 21.

Snout produced, pointed. Front margin of the nostril with a rather long, tapering tentacle. The second dorsal is nearly as large as the first, and much larger than, and in advance of, the anal. First dorsal nearly midway between the pectorals and ventrals. No distinct lower caudal lobe.

South Africa.

a. Type of the species: stuffed. Cabenda Bay. From Sir A. Smith's Collection.

10. TRIACIS *.

Triakis, *Müll. & Henle*, p. 63.
Rhinotriacis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 486.

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine. No pit at the root of the caudal; no lower caudal lobe. Membrana nictitans present. Spiracles small, behind the eyes. Mouth crescent-shaped, with well-developed long labial folds. Teeth small, numerous, similar in both jaws, each with a longer median cusp, and one or two small ones on each side.

Indian and Pacific Oceans.

1. Triacis scyllium.

Müll. & Henle, p. 63, pl. 26.

Snout short, rounded. Nostril with a broad rounded tentacle on its anterior margin. The first dorsal fin a little nearer to the ventrals than to the pectorals; the second is not much smaller than the first, but larger than, and in advance of, the anal. Brownish, with darker spots.

Japan.

2. Triacis semifasciata.

Triakis californica, *Gray, Chondropter.* p. 56 (no characters).
—— semifasciatum, *Girard, Proc. Ac. Nat. Sc. Philad.* 1854, p. 196, and *U. S. Pac. R.R. Exp. Fish.* p. 362.
Mustelus felis, *Ayres, Proc. Calif. Acad. Nat. Sc.* 1854, p. 17.

Snout moderately produced, rounded. Nostril with a broad anterior flap. The first dorsal fin is nearly midway between the pectorals and ventrals; the second is not much smaller than the first, and nearly entirely in advance of the anal. Upper parts with well-defined black cross bands, narrower than the interspaces. A row of rounded black spots along the side of the body, alternating with the dorsal cross bars.

---

* 1. Rhinotriacis henlei, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 486.—California.

Coasts of California.

a. Fine specimen (34 inches long). California. Purchased of the Godeffroy Museum.

b. Fine specimen, 27 inches long. San Francisco. Presented by Dr. W. O. Ayres.

c–g. Fœtus. Monterey.

11. MUSTELUS [*].

Mustelus, *Cuv. Règne Anim.*

The first dorsal fin opposite to the space between the pectorals and ventrals, without spine; the second not much smaller than the first. No pit at the root of the caudal, which is without distinct lower lobe. Membrana nictitans present. Spiracles small, behind the eyes. Mouth crescent-shaped, with well-developed, long labial folds. Teeth small, numerous, similar in both jaws, arranged like pavement, obtuse or with very indistinct cusps.

Temperate and tropical seas.

1. Mustelus lævis.

Γαλεὸς λεῖος, *Aristot. Hist. Anim.* vi. c. 10.
Galeus hinnulus, *Bellon. De Aquat.* p. 71.
—— lævis, *Rondel.* p. 375.
Squalus mustelus (part.), *L. Syst. Nat.* i. p. 400.
Mustelus lævis, *Risso, Eur. Mérid.* iii. p. 127; *Müll. & Henle*, p. 190, pl. 27. fig. 2; *Müller, Abhandl. Ak. Wiss. Berl.* 1840, p. 187, pl. 3. fig. 1; *Duméril, Elasmobr.* p. 401, pl. 3. figs. 4–6 (teeth).
—— punctulatus, *Risso, l. c.* p. 128.
—— equestris, *Bonap. Faun. Ital. Pesce.*
Squalus mustelus, *Blainv. Faun. Franç. Poiss.* p. 81, pl. 20. fig. 1.
Mustelus megalopterus, *Smith, Ill. Zool. South Afr. Pisc.* pl. 2.
—— vulgaris (part.), *Müll. & Henle*, p. 64.
Pleuracromylon lævis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 148.

Embryo attached to the uterus by a placenta. Snout moderately produced, the length of its præoral portion being equal to the distance between the angles of the mouth. The posterior teeth in the upper jaw are produced into an oblique point; sometimes another minute cusp at the base besides. Origin of the dorsal fin nearly opposite to the extremity of the inner margin of the pectoral. Uniform greyish, or with small black spots. Hind margin of the caudal fin generally blackish.

As far as my observations go, this is a more southern species than

---

[*] 1. Mustelus californicus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 148.—San Francisco.

M. vulgaris, being common in the Mediterranean and neighbouring parts of the Atlantic, extending to the coasts of the United States and to the Cape of Good Hope.

a. Adult male. Lisbon. Presented by the Rev. R. T. Lowe.
b. Adult male. Lanzarote. Presented by the Rev. R. T. Lowe.
c, d. Adult male and half-grown female. Madeira.
e–f. Adult: stuffed. Cape of Good Hope *. From Sir A. Smith's Collection.
g. Adult: stuffed. New York.

North-American writers mention, under the name of *Mustelus canis*, a Shark which appears to be either *M. vulgaris* or *M. lævis*; possibly both species are confounded under that name, as was the case for a long time with the two European forms. The references to the following works should be given:—*Squalus canis*, Mitch. Lit. & Phil. Trans. New York, i. p. 486; *Mustelus canis*, Dekay, New York Faun. Fish. p. 355, pl. 64. fig. 209; Storer, Mem. Amer. Ac. ii. p. 505; Poey, Repert. Fis.-nat. Cuba, 1868, p. 453.

2. Mustelus vulgaris.

Galeus asterias, *Rondel.* p. 377.
Mustelus lævis, *Salv.* p. 137, pl. 44 (cop. by *Willughby*, p. 60, pl. B 5. fig. 2; and *Jonston, De Pisc.* p. 26, tab. 8. fig. 6); *Yarr. Brit. Fish.* 2nd edit. ii. p. 512; *Parnell, Werner. Mem.* vii. p. 416.
Galeus lævis, *Gesner, De Aquat.* p. 616.
Smooth Hound, *Penn. Brit. Zool.* iii. p. 102, pl. 16, or, edit. 1812, iii. p. 151; *Couch, Fish. Brit. Isl.* i. p. 47, pl. 10.
Squalus émissole, *Lacép.* i. p. 242.
? Squalus mustelus †, *Bl. Schn.* p. 128; *Risso, Ichth. Nice*, p. 33.
? Mustelus stellaris, *Risso, Eur. Mérid.* iii. p. 126.
Galeorhinus hinnulus, *Blainv. Faun. Franç.* p. 83, pl. 20. fig. 2; *Thompson, Ann. Nat. Hist.* 1839, ii. p. 272, or *Nat. Hist. Irel.* iv. p. 252.
Galeus mustelus, *Leach, Wern. Mem.* ii. p. 63, pl. 2. fig. 3.
Mustelus plebejus, *Bonap. Faun. Ital. Pesce.*
—— vulgaris (part.), *Müll. & Henle*, p. 64.
—— vulgaris, *Müll. & Henle*, p. 190, pl. 27. fig. 1; *Müll. Abhandl. Ak. Wiss. Berlin*, 1840, p. 187, pl. 3. fig. 2; *Yarrell, Brit. Fish.* 3rd edit. ii. p. 495; *Duméril, Elasmobr.* p. 400, pl. 3. figs. 1–3 (teeth); *Bocage & Capello, Peix. Plagiost.* p. 16.

Embryo not attached to the uterus by a placenta. Snout moderately produced, the length of its præoral portion being equal to the distance between the angles of the mouth. All the teeth obtuse, without points. Origin of the dorsal fin nearly opposite to the middle of the inner margin of the pectoral fin. Uniform greyish, or with small whitish spots. Hind margin of the caudal fin generally whitish.

---

* These specimens would perhaps be referred by others to *Mustelus natalensis*, Steindachner, Sitzgsber. Ak. Wiss. Wien, 1866, liii. p. 482, pl. 1, which has been founded on a young example with obtusely tricuspid teeth. I regard them as identical with *M. lævis*.

† *Squalus mustelus*, Gronov. Syst. ed. Gray, p. 4, is probably a young *Carcharias*; the typical specimen is the skin of a fœtus in very bad condition.

European coasts, extending probably to the United States.

a, b–c. Fine adult examples. Guernsey. Presented by Dr. A. Günther.
d. Half-grown. Berwick-on-Tweed. Presented by Dr. Johnstone.
e–g. Adult: stuffed.
h. Jaws. Polperro.

3. Mustelus manazo.

Mustelus vulgaris, *Schleg. Faun. Japon. Poiss.* p. 303, pl. 134.
—— manazo, *Bleek. Verh. Bat. Gen.* xxvi. *Nieuwe Nalez. Japan*, p. 126.

Embryo not attached to the uterus by a placenta. Snout produced, pointed, the length of its præoral portion being rather more than the distance between the angles of the mouth. Teeth rhombic, without a distinct cusp. Origin of the dorsal fin opposite to the inner posterior angle of the pectoral. Uniform greyish, or with small whitish spots.

Japan; ? Ceylon.

a. Adult female with fœtus. Japan. Purchased of Mr. Jamrach.
b–d. Adult males and young. Japan. Purchased of Mr. Jamrach.
? *e*. Young. Ceylon. Presented by — Templeton, Esq.

4. Mustelus antarcticus.

Embryo not attached to the uterus by a placenta. Snout rather obtuse, not much produced, the length of its præoral portion being somewhat less than the distance between the angles of the mouth. The upper teeth with a rather cutting edge, but without prominent cusp. Origin of the dorsal fin behind the inner posterior angle of the pectoral. Uniform greyish.

In all other respects like *M. vulgaris*.

Southern Pacific.

a. Adult female with fœtus. New South Wales. From Mr. Krefft's Collection.
b. Adult male. Tasmania. Purchased of Mr. Schwarzschild.
c. Young. New Zealand. Presented by Sir John Richardson.
d–f. Adult: stuffed. Antarctic Expedition. Presented by the Lords of the Admiralty.

5. Mustelus maculatus.

Triakis maculatus, *Kner & Steindachner, Sitzgsber. Ak. Wiss. Wien*. 1867, liv. p. 391.

Embryo (?). Snout moderately produced, the length of its præoral portion being a little less than the distance between the angles of the mouth. Teeth less obtuse than is usual in the genus, the upper with one, two, or three very short cusps, most of the lower without cusps. Origin of the dorsal fin opposite to the inner posterior angle of the pectoral, its hinder lobe extending to the vertical from the root of the ventrals. Body with numerous round small black spots; posterior margin of the caudal black.

Hab. ——?

a. One of the typical specimens. From the Godeffroy Museum.

This species has been referred to *Triacis*; but the arrangement of the teeth is as in *Mustelus*; the lower are obtuse, and the upper provided with very short cusps only, reminding us of the teeth of *M. lævis*. Yet it must be confessed that this species connects those two genera, which in preceding systems are the types of families!

Mustelus dorsalis, Gill, Proc. Ac. Nat. Sc. Philad. 1864, p. 149, from Panama, agrees with *M. maculatus* in all the characters mentioned by the author in the diagnosis; however, he does not describe the coloration.

Fam. 2. LAMNIDÆ.

The first dorsal opposite to the space between the pectoral and ventral fins, without spine; an anal fin. No nictitating membrane. Mouth crescent-shaped, inferior; nostrils not confluent with the mouth. Gill-openings generally wide. Spiracles none, or minute.

Group A. LAMNINA.

12. LAMNA.

Lamna, *Cuvier.*
Oxyrhina, *Agassiz.*
Lamna *et* Oxyrhina, *Müller & Henle.*

The first dorsal fin opposite to the space between the pectoral and ventral fins, without spine; the second and the anal very small. A pit at the root of the caudal, which has the lower lobe much developed. Side of the tail with a keel. No membrana nictitans. Spiracles none*. Mouth wide. Teeth large, lanceolate, not serrated, sometimes with additional basal cusps. Gill-openings very wide.

Temperate and tropical seas.

1. Lamna cornubica.

Canis carcharias, *Aldrov. De Pisc.* p. 383.
Habrand, *Ascan. Ic.* pl. 31.
Porbeagle, *Borlase, Cornwall,* p. 265, pl. 26. fig. 4; *Penn. Brit. Zool.* iii. p. 103, or, edit. 1812, iii. p. 152; *Goodenough, Trans. Linn. Soc.* iii. p. 80, pl. 15; *Couch, Fish. Brit. Isl.* i. p. 41, pl. 8.
Beaumaris Shark, *Penn. Brit. Zool.* iii. p. 104, t. 17, or, edit. 1812, iii. p. 154, pl. 20.
Squalus cornubicus, *Gm. L.* i. p. 1497; *Bl. Schn.* p. 132; *Turt. Brit. Faun.* p. 113; *Donovan, Brit. Fish.* v. p. 108; *Neill, Werner. Mem.* i. p. 549; *Blainv. Faun. Fr.* p. 96, pl. 14. fig. 2; *Jenyns, Man.* p. 500; *Wright & Ekstr.* p. 135, tab. 30.
? Squalus long-nez, *Lacép.* i. p. 216, pl. 2. fig. 3.
Touille-bœuf, Loutre, *or* Taupe de mer, *Duhamel, Pesches,* ix. p. 298, pl. 20. fig. 4.

---

* I have examined fresh specimens of both the European species of from 3 to 4 feet in length. In the Porbeagle there was no spiracle; but a minute pore-like foramen could be seen on one side of an example of *L. spallanzani*. Under these circumstances I think it better to class *Lamna* with the genera without spiracles. These openings have been used as a family character!

Squalus nasus, *Walbaum, Artedi*, iii. p. 517.
—— pennanti, *Walbaum, l. c.*
—— glaucus, *Gunner, Norsk. Vid. Selsk. Skr.* iv. p. 1.
—— monensis, *Shaw, Gen. Zool.* v. 2. p. 350; *Jenyns, Man.* p. 501.
—— selanonus, *Leach, Werner. Mem.* ii. p. 64, pl. 2. fig. 2.
? Squalus rostratus, *Sav. Macri, Mem. Accad. Sc. Napol.* 1819, i. p. 55, tab. 1. fig. 2 (very bad).
Lamna cornubica, *Flem. Brit. An.* p. 168; *Müll. & Henle*, p. 67; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 515, or 3rd edit. ii. p. 498; *Parnell, Werner. Mem.* vii. p. 413; *Bonap. Faun. Ital. Pesc.*; *Agass. Poiss. Foss.* iii. p. 287, tab. G. figs. 3*a*–3*d*; *Schleg. Faun. Japon. Poiss.* p. 304; *Thompson, Nat. Hist. Ireland*, iv. p. 251; *Kröyer, Danm. Fisk.* iii. p. 852; *Nilss. Skand. Faun. Fisk.* p. 718; *Duméril, Elasmobr.* p. 405; *Bocage & Capello, Peix. Plagiost.* p. 12.
Selanonius walkeri, *Flem. Brit. An.* p. 169.
Squalus (Carcharinus) lamia, *Blainv. Faun. Franç.* p. 88.
—— (——) cornubicus, *Blainv. l. c.* p. 96, tab. 14. fig. 2.
? Carcharias griseus, *Ayres, Bost. Journ. Nat. Hist.* iv. 1844, p. 293, pl. 12. fig. 4 (bad).
Isurus cornubicus, *Gray, Catal. Chondropt.* p. 58.

Præoral portion of the snout longer than the longitudinal axis of the cleft of the mouth, conical, pointed. Angle of the mouth nearly midway between the gill-opening and nostril. Teeth $\frac{13-16}{12-14}$ on each side, lanceolate, with a small basal cusp on each side in adult specimens; in young specimens these cusps are absent. *The third tooth on each side of the upper jaw is very small.* The width of the first gill-opening is nearly equal to its distance from the last. Origin of the dorsal fin above the root of the pectorals, which are somewhat falciform, the length of their lower margin being nearly one-fourth of that of the upper.

Vert. 155, 74 of which are between the skull and second dorsal fin.

Atlantic; Mediterranean; Japan.

a–b. Adult, male and female, 8 feet long: stuffed. English coast.
c. Fine young specimen, 3½ feet long. Eastbourne. Presented by Mr. Gerrard.
d. Half-grown: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.
e. Half-grown: stuffed. English coast.
f–g. Jaws of adult examples.
h. Skeleton of a young example.

2. **Lamna spallanzanii.**

Canis carcharias, *Aldrovand.* p. 388.
? *Spallanzani, Viagg. Sic.* iv. p. 325.
Lamna punctata, (not *Mitch.*) *Storer, Bost. Journ. Nat. Hist.* ii. 1839, p. 534, pl. 8. fig. 2; *Dekay, New York Faun. Fish.* p. 352, pl. 63. fig. 206 *.
Oxyrhina spallanzanii, *Bonap. Faun. Ital. Pesc.*; *Duméril, Elasmobr.* p. 408.

---

* In this figure the dorsal fin is placed as in *L. glauca*.

Oxyrhina, *Agassiz, Poiss. Foss.* iii. p. 276, pl. G. figs. 2, *2a–2d.*
—— gomphodon, *Müll. & Henle,* p. 68, pl. 28; *Bocage & Capello, Peix. Plagiost.* p. 13.
Lamna, *Owen, Odontogr.* pl. 5. fig. 1.
Isuropsis dekayi, *Gill, Ann. Lyc. Nat. Hist. New York,* vii. p. 409.
Oxyrhina punctata, *Duméril, Elasmobr.* p. 409.

Præoral portion of the snout as long as the longitudinal axis of the cleft of the mouth, tetrahedral, pointed. Angle of the mouth midway between the gill-opening and nostril. Teeth $\frac{13}{13}$ on each side, long, lanceolate, with sharp lateral edges, without basal cusps. The third tooth on each side of the upper jaw is much smaller than those next to it. Gill-openings extremely wide, the width of the first being rather more than its distance from the last. Origin of the dorsal fin at a very short distance from the base of the pectorals, which are falciform, the length of their lower margin being one-fourth of that of the upper.

Mediterranean and Atlantic.

a. Fine young specimen, 33 inches long. Madeira. Presented by J. Y. Johnson, Esq.
b–d. Jaws of very large examples.

3. Lamna glauca.

Oxyrhina glauca, *Müll. & Henle,* p. 69, pl. 29; *Schleg. Faun. Japon. Poiss.* p. 303; *Duméril, Elasmobr.* p. 409.

Scarcely distinct from *L. spallanzanii,* from which it has been separated on account of the more backward position of the dorsal fin, which is opposite to the middle of the interspace between pectoral and ventral.

Japan; Cape seas.

a. Stuffed, 36 inches long. Cape seas.
b. Stuffed, 29 inches long.
c. Jaws. St. Helena. Presented by J. C. Melliss, Esq.

13. CARCHARODON.

Carcharodon, (*A. Smith**) *Müller & Henle,* p. 70.

The first dorsal fin opposite to the space between the pectoral and ventral, without spine; the second and the anal very small. A pit at the root of the caudal, which has the lower lobe well developed. Side of the tail with a keel. No membrana nictitans. Spiracles minute (and probably frequently absent). Mouth crescent-shaped, wide. Teeth large, flat, erect, regularly triangular, serrated. Gill-openings wide.

Temperate and tropical seas.

---

* The author of the first volume of the 'Ichthyologie Générale' will be glad to hear that Sir Andrew Smith continues to take interest in the progress of his favourite science (1870). See Duméril, Elasmobr. p. 410, footnote 1.

1. Carcharodon rondeletii.

The Great Blue Shark.
Lamia, *Rondel*, p. 390; *Gesner, De Aquat.* p. 173; *Aldrov.* p. 383.
Carcharias verus, *Agass. Poiss. Foss.* iii. p. 91, tab. F. fig. 3 (teeth).
Carcharodon lamia, *Bonap. Faun. Ital. Pesc.*
—— rondeletii, *Müll. & Henle, Plag.* p. 70; *Duméril, Elasmobr.* p. 411; *Bocage & Capello, Peix. Plagiost.* p. 13.
—— capensis, *Smith, Ill. Zool. S. Afr. Pisc.* pl. 4.
? Carcharias atwoodi, *Storer, Proc. Bost. Soc. Nat. Hist.* iii. 1848, p. 71.—*Cfr. Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 260.

The third tooth on each side of the upper jaw is conspicuously smaller than the second and fourth. Teeth $\frac{12}{11}$ on each side. The second dorsal fin in advance of the anal.

From the Mediterranean to Australia.

a. Stuffed, 6½ feet long. Cape seas. From the Collection of the Zoological Society.
b–c. Jaws from specimens 36½ feet long. Port Fairey (?), Australia.
d. Jaws of a large example. From the Collection of the Zoological Society.

14. ODONTASPIS.

Odontaspis, *Agass. Poiss. Foss.* iii. p. 87.
Triglochis, *Müll. & Henle, Mag. Nat. Hist.* 1838, ii. p. 88.

The first dorsal fin opposite to the space between the pectoral and ventral, without spine; the second and the anal not much smaller than the first dorsal. No pit at the root of the caudal. Side of the tail without keel. No membrana nictitans. Spiracles minute, porelike, above the angle of the mouth. Mouth crescent-shaped, wide. Teeth large, awl-shaped, with one or two small cusps at the base. Gill-openings of moderate width.

Temperate and tropical seas.

1. Odontaspis americanus.

Squalus americanus, *Mitch. Phil. & Lit. Trans. New York*, i. p. 483; *Dekay, New York Faun. Fish.* p. 366; *Storer, Bost. Journ. Nat. Hist.* 1844, iv. p. 188.
—— macrodus, *Mitch. Am. Monthl. Mag.* ii. 1818, p. 328.
? Squalus littoralis, *Mitch. l. c.*; or *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 224; or *Dekay, New York Faun. Fish.* p. 351.
Odontaspis taurus, (*Rafinesque*) *Müll. & Henle*, p. 73, pl. 30; *Duméril, Elasmobr.* p. 417.
—— americanus, *Abbott, Proc. Ac. Nat. Sc. Philad.* 1861, p. 399; *Duméril, l. c.* p. 419.
Eugomphodus littoralis, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 260.

The first tooth of the upper jaw not smaller than the second. One or two small teeth between the third and fourth long tooth on each side of the upper jaw. Long teeth with a single small cusp on each side of the base. The first dorsal very close to the root of the ventral*.

Atlantic; southern Pacific.

---

* Sometimes nearer, sometimes at a greater distance, which difference appears

a. Stuffed, 10½ feet long. South Australia.
b. Stuffed, 42 inches long. Cape seas. From Sir A. Smith's Collection.
c–f. Jaws of very large specimens. Tasmania.

2. Odontaspis ferox.

Squalus ferox, *Risso, Ichth. Nice*, p. 38; *Blainv. Faun. Fr.* p. 87.
Carcharias ferox, *Risso, Eur. Mérid.* iii. p. 122; *Guichen. Explor. Algér. Poiss.* p. 124.
Odontaspis ferox, *Agass. Poiss. Foss.* iii. pp. 87 & 288, tab. G. fig. 1 (teeth); *Müll. & Henle*, pp. 74, 191; *Bonap. Faun. It. Pesce*; *Duméril, Elasmobr.* p. 418.

Teeth of the upper jaw: the first much smaller than the second and third, which is followed by four very small teeth, the following teeth being again of large size. Each tooth with a double cusp on each side of the base. (*Agass.*)

Mediterranean.

15. ALOPECIAS.

Alopias (Alopecias), *Müll. & Henle*, p. 74.

The first dorsal fin opposite to the space between the pectoral and ventral, without spine; the second and anal very small. Caudal fin of extraordinary length, with a pit at its root. No keel on the side of the tail. No membrana nictitans. Spiracles immediately behind the eye, minute (and probably frequently absent). Mouth crescent-shaped. Teeth equal in both jaws, of moderate size, flat, triangular, not serrated. Gill-openings of moderate width.

Temperate and tropical seas.

1. Alopecias vulpes.

Fox; Thrasher.
Vulpes, *Rondel.* p. 387; *Gesner, De Aquat.* p. 1043.
Simia, *Bellon. De Aquat.* p. 65.
Singe de mer, *Belon, Nat. et Divers. des Poiss.* p. 88.
Vulpecula, *Salvian.* p. 134, pl. 42; *Willughby*, tab. B 6. fig. 2; *Jonston, De Pisc.* tab. 7. fig. 3; *Aldrovand.* p. 396.
Squalus no. 8, *Artedi, Gen.* p. 68; *Synon.* p. 96.
Renard marin, *Perrault, Mém. Ac. Sc.* iii. pls. 15, 16; *Duhamel, Pesch.* ii. sect. ix. p. 303, pl. 21. figs. 1 & 2; *Lacép.* i. p. 267.
Sea-fox, Thresher, or Thrasher, *Borlase, Cornw.* p. 265; *Couch, Fish. Brit. Isl.* i. p. 37, pl. 7.
Galeus cauda longa, *Klein, Pisc. Miss.* iii. p. 10.
Long-tailed Shark, *Penn. Brit. Zool.* iii. p. 97, pl. 14, or, edit. 1812, iii. p. 145, pl. 17.
Squalus vulpes, *Gm. L. Syst. Nat.* i. p. 1496; *Bl. Schn.* p. 127; *Turt. Brit. Faun.* p. 102; *Mitch. in Phil. & Lit. Trans. N. York*, i. p. 482; *Blainv. Faun. Fr.* p. 94, pl. 14. fig. 1.
Carcharias vulpes, *Cuv. Règne An.*; *Risso, Ichth. Nice*, p. 36, and

---

to be due to sex or age of the individuals. In stuffed examples the exact relative position of the fins is very rarely preserved. The posterior teeth are very small, and vary in number; thus, for instance, one example has 19 teeth on one side of the upper jaw and 25 on the other.

Eur. Mérid. iii. p. 120; *Dekay, New York Faun. Fish.* p. 348, pl. 61. f. 199; *Guichen. in Explor. Algér.* p. 124, and in *Gay's Chile, Zool.* ii. p. 363.
Alopias vulpes, *Bonap. Faun. Ital. Pesc.*; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 522, or 3rd edit. ii. p. 512; *Müll. & Henle*, p. 74, tab. 35. fig. 1 (teeth); *Kröy. Danm. Fisk.* iii. pp. 929, 937; *Storer, Mem. Am. Acad.* ii. p. 505; *Duméril, Elasmobr.* p. 421; *Bocage & Capello, Peix. Plagiost.* p. 14.
Squalus alopecias, *Gronov. Syst.* ed. *Gray*, p. 7.
? Alopias vulpes, *Ayres, Proc. Calif. Ac. Nat. Sc.* iii. pp. 15, 66.

The third tooth on each side of the upper jaw much smaller than the others. Pectorals large, falciform.

Mediterranean and Atlantic; ? California.

a. Stuffed, 13 feet long. English coast.
b. Stuffed, 6 feet long. Cape seas.

Group B. SELACHINA.

16. SELACHE.

Selache, *Cuv. Règne Anim.*

The first dorsal fin opposite to the space between the pectoral and ventral fins, without spine; the second and the anal fin very small; a pit at the root of the caudal fin, which is provided with a lower lobe. Side of the tail with a keel. No membrana nictitans. A very small spiracle above the angle of the mouth. Gill-openings extremely wide. Teeth very small, numerous, conical, without serrature or lateral cusps.

Arctic regions.

1. Selache maxima.

Squalus maximus, *Gunner, Trondj. Selsk. Skrift.* 1765, iii. p. 33, tab. 2, iv. p. 14, tab. 3; *L. Syst. Nat.* i. p. 400; *Lacép.* i. p. 209; *Bl. Schn.* p. 134; *Flem. Brit. An.* p. 164; *Mitchill, Lit. & Philos. Trans. New York*, i. p. 486.
Basking Shark, *Penn. Brit. Zool.* iii. p. 89, pl. 13, or, edit. 1812, iii. p. 134, pl. 16; *Lowe, Faun. Orcad.* p. 171: *Home, Philos. Trans.* 1809, p. 206, tab. 6. fig. 1; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 518, or 3rd edit. ii. p. 508; *Couch, Fish. Brit. Isl.* i. p. 60, pl. 14.
Squalus peregrinus, *Blainv. Ann. Mus.* xviii. p. 88, pl. 6.
Cetorhinus gunneri, homianus *et* shavianus, *Blainv. Bull. Soc. Philom.* 1810, p. 169.
Selache maxima, *Cuv. Règne Anim.*; *Faber, Naturgesch. Fisch. Isl.* p. 10; *Müll. & Henle*, p. 71; *Nilss. Skand. Faun. Fisk.* p. 720; *Parnell, Werner. Mem.* vii. p. 418; *Richards. Faun. Bor.-Am. Pisc.* p. 291; *Thompson, Nat. Hist. Ireland*, iv. p. 253; *Owen, Osteolog. Catal.* i. p. 97; *Duméril, Elasmobr.* p. 413; *Bocage & Capello, Peix. Plagiost.* p. 14.
Squalus isodus, *Saverio Macri, Att. Accad. Sc. Napol.* 1819, i. p. 55, tab. 1. fig. 1, tab. 2. fig. 2.
—— elephas, *Lesueur, Journ. Ac. Nat. Sc. Philad.* ii. p. 343, c. fig. (cop. by *Dekay, New York Faun. Fish.* p. 357, pl. 63. fig. 208).
—— cetaceus, *Gronov. Syst.* ed. *Gray*, p. 6.

Monstrosities :—

Squalus rashleighanus, *Couch, Trans. Linn. Soc.* xiv. p. 91.
Polyprosopus (!) rashleighanus, *Couch, Hist. Brit. Fish.* i. p. 67, pl. 15.
—— macer, *Couch, ibid.*

The gill-openings extend from the back nearly to the median line of the throat.

Attains to a length of more than 30 feet. Arctic seas; occasionally as far south as the coasts of Portugal and New Jersey.

I insert here, for the present, a genus the natural affinities of which appear to be with the *Mustelina*; but as it is said to lack a nictitating membrane, I am compelled to remove it from that group.

17. PSEUDOTRIACIS.

Pseudotriakis, *Capello, Jorn. Sc. Math. Phys. e nat. Lisboa,* iv. 1867.

Two dorsal fins, without spines, the first very low and long, opposite to the space between the pectorals and ventrals. No pit at the root of the caudal fin (?), which is without lower lobe. An anal fin. No membrana nictitans. Spiracles behind the eye. Mouth crescent-shaped, with a very short groove at the angle of the mouth. Teeth very small, pointed, with small lateral cusps. Gill-openings rather narrow.

Coasts of Portugal.

1. Pseudotriacis microdon.

Capello, l. c. pl. 5. fig. 1.

The first dorsal fin terminates in front of the ventrals, the second opposite to and as large as the anal. Length of the mouth rather more than that of the snout. Nostrils nearly on the same level with the front margin of the mouth. (*Capello.*)

Portugal.

Fam. 3. RHINODONTIDÆ.

Characters of the single genus.

18. RHINODON.

Rhinodon, *Smith.*

The origin of the first dorsal fin is somewhat in advance of the root of the ventrals; the second small, opposite to the anal; both without spines. A pit at the root of the caudal, which has the lower lobe well developed. Side of the tail with a keel. Membrana nictitans none*. Spiracles very small. Mouth and nostril near the extremity of the snout. Teeth extremely small and numerous, conical. Gill-openings wide.

Cape of Good Hope; Seychelles.

1. Rhinodon typicus.

Smith, Ill. Zool. S. Afr. Fish. pl. 26; *Müll. & Henle,* p. 77, tab. 35. fig. 2 (teeth); *Duméril, Elasmobr.* p. 428.

Snout very broad, short, and flat. Eyes very small. Upper jaw with a long labial fold. Brownish, with whitish dots and narrow transverse lines.

Cape of Good Hope; Seychelles.

a. Portions of the jaws. Seychelles. Presented by Prof. E. P. Wright.

Mr. Gill (Proc. Ac. Nat. Sc. Philad. 1865, p. 177) has distinguished a large Shark from California, the existence of which is known from the teeth only, under the name of *Micristodus punctatus.* He describes it in the following terms:—"The dried dentigerous band of the upper jaw is slightly curved forwards, about 19 inches between the extremities, and somewhat more than an inch in width in front. The teeth are fixed and extremely minute, the largest being little more than a *line* in length (in an example 20 feet long), and decrease towards the ends of the jaw; they are disposed in regularly transverse rows, of which there are over 160 (164–167) on each side, while in front there are from 13 to 16 in each transverse row; each tooth is recurved backwards and acutely pointed, swollen and with a heel-like projection in front rising from its base."

---

* A preparation brought home by Prof. Wright shows clearly that there is really no nictitating membrane.

Fam. 4. NOTIDANIDÆ.

Characters of the single genus.

19. NOTIDANUS.

Notidanus, *Cuv.*
Hexanchus *et* Heptanchus, *auct.*
Monopterhinus (part.), *Blainv.*

One dorsal fin only, without spine, opposite to the anal. No pit at the root of the caudal fin. No membrana nictitans. Spiracles small, on the side of the neck. No labial fold. Mouth crescent-shaped. Dentition unequal in the jaws: in the upper jaw one or two pairs of awl-shaped teeth, the following six being broader and provided with several cusps, one of which is much the strongest. Lower jaw with six large comb-like teeth on each side, beside the smaller posterior teeth. Six or seven wide gill-openings.

Temperate and tropical seas.

a. Gill-openings six: Hexanchus.

1. Notidanus griseus.

Piscis vacca, *Scilla*, *De corpor. marin. lapidescent.* tabb. 1, 27, & 28.
Griset, *Brouss. Ac. Sc.* 1780, p. 663; *Lacép.* i. p. 269.
Squalus griseus, *Gm. L.* i. p. 1495; *Bl. Schn.* p. 129; *Risso, Ichth. Nice*, p. 37.
—— vacca, *Bl. Schn.* p. 138.
Monopterhinus griseus, *Blainv. Faun. Fr.* p. 77.
Notidanus griseus, *Cuv. Règne An.*; *Bonap. Faun. Ital. Pesc.*; *Couch, in Zoologist*, 1846, p. 1337, and *Fish. Brit. Isl.* i. p. 21, pl. 4; *Bocage & Capello, Peix. Plagiost.* p. 15.
—— monge, *Risso, Eur. Mérid.* iii. p. 129.
Hexanchus griseus, *Müll. & Henle*, p. 80; *Yarr. Brit. Fish.* 3rd edit. ii. p. 515; *Duméril, Elasmobr.* p. 431, pl. 4. figs. 9–12 (teeth).
Teeth: *Agass. Poiss. Foss.* iii. pp. 92, 216, tab. E. figs. 2–4.

Snout obtuse, rounded, the nostrils being nearer to its extremity than to the mouth. Dorsal and anal fins equal in size and shape; about one-half of the former is in advance of the anal. No single median pointed tooth in the upper jaw. The first cusp of the lower teeth not much larger than the following.

Mediterranean and Atlantic.

a. Female: stuffed, 12 feet long. Isle of Wight. Presented by Capt. Swinburn, R.N.
b. Male: stuffed, 7 feet long. Polperro.
c. Young. Nice. From Dr. Deakin's Collection.

d. Young: stuffed. From Mr. Yarrell's Collection.—Spotted with black.
e. Jaws of spec. *a*.

β. *Gill-openings seven*: Heptanchus.

2. Notidanus cinereus.

Perlon, *Brouss. Ac. Sc.* 1780, p. 668; *Lacép.* i. p. 220.
Squalus cinereus, *Gm. L.* i. p. 1497; *Bl. Schn.* p. 133; *Risso, Ichth. Nice*, p. 24.
Monopterhinus cinereus, *Blainv. Faun. Fr.* p. 80.
Notidanus cinereus, *Cuv. Règne Anim.*; *Bonap. Faun. Ital. Pesc.*
Heptanchus cinereus, (*Rafin.*) *Müll. & Henle*, p. 81, tab. 35. fig. 3 (teeth); *Duméril, Elasmobr.* p. 432.
Heptancus angio, *Costa, Faun. Nap. Chondrott.* p. 5, tav. 13, and tav. 14. fig. 3.

Snout produced and pointed; cleft of the mouth nearly as long as broad. Anal fin as long as, but lower than the dorsal; two-thirds of the dorsal are in advance of the anal. No single median pointed tooth in the upper jaw; the lower median tooth with a strong central cusp. The first cusp of the lower teeth is much longer than the others, and has one or two additional small cusps at its base.

Mediterranean and Atlantic.

a. Fine half-grown female. Nice. From Dr. Deakin's Collection.
b–c. Half-grown female and several fœtus. Madeira. Presented by J. Y. Johnson, Esq.
d. Adult male: stuffed, 7 feet long. From the Antarctic Expedition.
e. Head: dried. Madeira. From the Collection of the Zoological Society.

3. Notidanus platycephalus.

Squalus platycephalus, *Tenore, Mem. Accad. Pont.* i. 1809, pp. 241, 258.
Heptanchus platycephalus, *Costa, Faun. Nap. Chondrott.* p. 12, tav. 14.

Snout short and obtuse. No single median pointed tooth in the upper jaw; the lower median tooth with a central cusp. The first cusp of the lower teeth is much longer than the others, and has not any additional cusps at its base. (*Costa.*)

Mediterranean.

4. Notidanus indicus.

Notidanus indicus, *Cuv. Règne Anim.*; *Agass. Poiss. Foss.* iii. pp. 92, 217, tab. E. fig. 1 (teeth).
Heptanchus indicus, *Müll. & Henle*, p. 82, pl. 32 (teeth not good); *Schleg. Faun. Japon. Poiss.* p. 303; *Duméril, Elasmobr.* p. 434; *Macdonald & Barron, Proc. Zool. Soc.* 1868, p. 371, pl. 33.
Notorhynchus maculatus, *Ayres, Proc. Calif. Ac. Nat. Sc.* i. p. 72; *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 495, and 1864, p. 149.

Heptanchus maculatus, *Girard, U. S. Pac. R.R. Exp. Fish.* p. 367.
Notorhynchus borealis, *Gill, l. c.* 1864, p. 150.

Snout short and rounded; cleft of the mouth broader than long. A single median pointed tooth in the upper jaw; the lower median tooth with lateral cusps, but without central cusp. The first cusp of the lower teeth is much stronger than the others, and serrated on its outer margin.

From the Cape of Good Hope to California.

a. Stuffed, 4½ feet long. Cape Seas.
b. Jaws of an adult example.

Fam. 5. SCYLLIIDÆ.

The first dorsal fin above or behind the ventrals, without spine; an anal fin. No membrana nictitans. Spiracle always distinct Mouth inferior. Teeth small, several series being generally in function.

20. SCYLLIUM.

Scyllium, sp., *Cuv. Règne An.*
Scyllium, *Müll. & Henle*, p. 3.
Scylliorhinus, Halælurus, Poroderma *et* Cephaloscyllium, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 407.

Two dorsal fins without spines, the first above or behind the ventrals; the origin of the anal fin is always in advance of that of the second dorsal. Spiracle behind the eye. Nasal cavity separate from the mouth. Teeth small, with a middle longer cusp and generally one or two small lateral cusps, arranged in numerous series. Eggs similar to those of the Rays. Upper edge of the caudal fin not serrated.

Temperate and tropical seas. The species do not attain to a large size.

1. Scyllium marmoratum.

Scyllium marmoratum, *Benn. Life of Raffles*, p. 693.
—— maculatum, *Gray, Ind. Zool.*; *Richards. Ichth. Chin.* p. 193; *Müller & Henle*, p. 5, pl. 7; *Cant. Mal. Fish.* p. 391; *Bleek. Verh. Bat. Gen.* xxiv. *Plagiost.* p. 16; *Duméril, Elasmobr.* p. 319 (not *Bl. Schn.*).

Nasal valves confluent, without cirrus, forming together a broad flap in front of the mouth, the posterior edge of the flap being free, not interrupted in the middle, concave. Both jaws with a well-developed labial fold, extending from near the symphysis of the lower jaw, round the angle of the mouth, to the nasal flap. Teeth of both jaws very small. Gill-openings as wide as the slit for the eye. Ventral fins subtruncated behind. End of the anal fin below the middle of the dorsal; the length of its base is nearly equal to that of the dorsal, and about two-thirds of its distance from the caudal. Upper parts with irregular brown spots more or less confluent into ocelli or undulated bands. Lower parts immaculate.

East-Indian archipelago.

a. Half-grown: skin. Singapore. From Dr. Cantor's Collection.
b. Half-grown. India. Presented by General Hardwicke.—Type of *Sc. maculatum*.

c. Half-grown: skin. Sumatra. Presented by Sir T. S. Raffles.—Type of the species.
d. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
e. Adult. India.
f. Adult: stuffed. Presented by Sir A. Smith.

2. Scyllium maculatum.

Squalus maculatus, *Bl. Schn.* p. 130 (not *auct.*).
? Squalus cuvier, *Péron & Les. Journ. Ac. Nat. Sc. Phil.* ii. p. 351.

Nasal valves confluent, without cirrus, forming together a broad flap in front of the mouth, with the hinder margin concave. Both jaws with a well-developed labial fold, extending from the symphysis of the lower jaw, round the angle of the mouth, to the nasal flap. Teeth of the lower jaw of moderate size, with a long median cusp, and a pair of small cusps on each side. Gill-openings narrow. Skin of the trunk rough. Ventral fins obliquely truncated behind. End of the anal fin below the middle of the dorsal; the length of its base is equal to that of the dorsal, and three-fourths of its distance from the caudal. Brownish above and below, with scattered round brown spots scarcely as large as the eye, and distant from one another.

Australian seas.

a. Stuffed, 23 inches long. Bramble Bay. Presented by the Earl of Derby.

This species differs from *Sc. marmoratum*, beside the coloration, in the much larger size of the teeth; one of the mandibular teeth is 3 millims. long, and as many broad in the example described. Also the gill-openings are considerably narrower.

3. Scyllium edwardsii.

Squalus catulus, *Edwards, Glean.* iii. tab. 289.
Scyllium edwardsii, *Cuv. Règne An.*; *Müll. & Henle*, p. 4, pl. 1; *Duméril, Elasmobr.* p. 319.
—— pictum, *Müll. & Henle*, pp. 4, 189.

Nasal valves confluent, without cirrus, forming together a broad flap in front of the mouth, the posterior edge of the flap being free, not interrupted in the middle, scarcely concave. A short labial fold round the angle of the mouth, not extending far towards the symphysis of the jaws. Teeth of both jaws minute, tricuspid. End of the anal fin below the anterior part of the dorsal; the length of its base is more than that of the dorsal; and about two-thirds of its distance from the caudal. Uniform dark brown (in a preserved state).

Cape of Good Hope.

a–f. Stuffed, 19–25 inches long. From Sir A. Smith's Collection.
g–h. Young. From Sir A. Smith's Collection.

4. Scyllium canicula.

Galeus stellaris major, *Bellon. De Aquat.* p. 73.
Canicula aristotelis, *Rondel.* p. 380.
Catulus minor, *Salv.* i. fol. 137 c. ic.; *Aldrov.* iii. c. 34, p. 390; *Willughby*, p. 64, tab. B 4. fig. 2; *Jonston*, p. 25, tab. 8. fig. 2.
Squalus, sp., *Artedi, Gen.* nos. 10 & 11 (synon. much confused).
Squalus, sp., *Gronov. Mus.* ii. p. 44. no. 199, and *Zoophyl.* p. 32. no. 144.
Squalus canicula, *L. Syst. Nat.* i. p. 399; *Risso, Eur. Mérid.* iii. p. 116.
—— catulus, *L. Syst. Nat.* i. p. 400; *Brünn. Ichth. Mass.* p. 5; *Bl.* pl. 114; *Bl. Schn.* p. 127; *Risso, Ichth. Nice*, p. 29; *Donov. Brit. Fish.* iii. pl. 55; *Gronov. Syst.* ed. *Gray*, p. 5.
Lesser Spotted Dog-fish (male) and Spotted Dog-fish (fem.), *Penn. Brit. Zool.* iii. pp. 101, 99, pl. 15, or, edit. 1812, pp. 148, 150, pl. 19; *Couch, Fish. Brit. Isl.* i. p. 14, pl. 2.
Grande Roussette, *Duham. Pesches*, iii. sect. ix. p. 304, pl. 22. fig. 1.
Squale rochier, *Lacép.* i. p. 233, pl. 10. fig. 1.
Scyllium canicula, *Cuv. Règne An.*; *Bonap. Faun. Ital. Pesc.*; *Müll. & Henle*, p. 6, pl. 7; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 487, 3rd edit. ii. p. 470; *Parn. Wern. Mem.* vii. p. 407; *Nilss. Skand. Faun. Fisk.* p. 711; *Thompson, Nat. Hist. Ireland*, iv. p. 247; *Kröyer, Danm. Fisk.* iii. p. 814; *Duméril, Elasmobr.* p. 315; *Bocage & Capello, Peix. Plagiost.* p. 11.
Scylliorhinus catulus, *Blainv. Faun. Franç.* p. 69, pl. 17. fig. 1.
? Squalus elegans, *Blainv. l. c.* p. 73.

The nasal valves confluent, without cirrus, forming together a simple broad flap in front of the mouth, the posterior edge of the flap being nearly entirely free, not interrupted in the middle. Lower jaw with a lateral labial fold; upper jaw without trace of a labial fold. Teeth of moderate size. Ventral fin with the posterior portion prolonged, its length being nearly equal to the distance of the first gill-opening from the extremity of the snout. Anal fin entirely in front of the dorsal, the length of its base being equal to its distance from the caudal. Upper parts finely dotted with brown; fins with larger spots.

Coasts of Europe.

a. Adult: Stuffed. English coast.
b. Adult: skin. English coast. From Yarrell's Collection.
c–e. Fine specimens. Guernsey. Presented by Dr. A. Günther.
f, *g*, *h*. Half-grown. Holland. From the Collection of Dr. van Lidth de Jeude.
i–k. Adult and half-grown. Lisbon. Presented by the Rev. R. T. Lowe.
l. Half-grown: stuffed. Lisbon.
m. Adult. Nice. From Dr. Deakin's Collection.
n, *o*. Adult and half-grown. Mediterranean.
p–s. Adult: stuffed. Mediterranean.
t. Adult. Dalmatia.
u–w. Adult, half-grown, and young. Golden Horn. From Mr. Millingen's Collection.

5. Scyllium stellare.

Galeus stellaris minor, *Bellon. De Aquat.* p. 74.

Canicula saxatilis, *Rondel.* p. 383.
Catulus major, *Salvian.* i. p. 138, c. ic.; *Aldrov.* p. 390; *Willughby,* p. 62, tab. B 4. fig. 1.
Squalus, sp., *Artedi, Gen.* p. 69. no. 12; *Gronov. Mus. Ichth.* ii. p. 45. no. 200, and *Zoophyl.* p. 32. no. 145.
Squalus stellaris, *L. Syst. Nat.* i. p. 399; *Risso, Ichth. Nice,* p. 31, and *Eur. Mérid.* iii. p. 116.
—— canicula, *Brünn. Ichth. Mass.* p. 4; *Bl.* tab. 112; *Bl. Schn.* p. 126.
Chat rochier ou Petite Roussette, *Duhamel, Pesches,* iii. sect. ix. p. 304, pl. 22. figs. 2 & 3.
Roussette, *Lacép.* i. p. 221.
Scyllium catulus, *Cuv. Règne An.*; *Parn. Wern. Mem.* vii. p. 410; *Müll. & Henle,* p. 9, pl. 7; *Bocage & Capello, Peix. Plag.* p. 11; *Duméril, Elasmobr.* p. 316; *Coste, Compt. Rend.* 1867, Januar. p. 99, or *Ann. Mag. Nat. Hist.* 1867, xix. p. 227.
—— stellare, *Flem. Brit. An.* p. 165; *Bonap. Faun. It. Pesc.*; *Thompson, Nat. Hist. Ireland,* iv. p. 247.
Scylliorhinus stellaris, *Blainville, Faune Franç.* p. 71, pl. 17. fig. 2.
Spotted Dog-fish, var., *Penn. Brit. Zool.* iii. p. 100, and, ed. 1812, iii. p. 150.
Large Spotted Dog-fish, *Yarrell,* 2nd ed. ii. p. 493, 3rd edit. ii. p. 477.
Nurse Hound, *Couch, Hist. Fish. Brit. Isl.* i. p. 11, pl. 1.

The nasal valves are not confluent, separated from each other by a considerable interspace; they are slightly folded, but without prominent cirrus. Lower jaw with a short lateral labial fold commencing from the angle of the mouth; upper jaw without trace of a labial fold. Teeth very small, those of the lower jaw narrow, without lateral cusp. Ventral fin with the posterior portion subtruncated. End of the anal fin below the middle of the dorsal, the length of its base being rather more than its distance from the caudal. Upper parts with rounded brown spots, some of which are nearly as large as the eye.

Vert. 134, 61 of which are in front of the anal.

Coasts of Europe.

a, b. Adult: stuffed. Firth of Forth. Purchased of Mr. Parnell
c–d. Adult and half-grown. Lyme Regis. Presented by the Earl of Enniskillen.
e. Adult: stuffed. England. Museum Sloane.
f. Half-grown. Dalmatia.
g–k. Young. Mediterranean.
l–m. Adult and half-grown: stuffed. Mediterranean.
n. Young.
o. Skeleton.

Scyllium, sp., Filippi, Rev. et Mag. Zool. 1853, pp. 169, 286; *Scyllium acanthonotum*, Filippi, Mem. Ac. Sc. Torin. xviii. 1859, p. 193, fig. 2; Duméril, Elasmobr. p. 324. This name has been given to a fœtal example from the Mediterranean, with a double series of spines along the back. Such spines are found in the embryos of a number of species of *Scyllium*, *Chimæra*, &c. The specimen examined by Filippi was either a *Sc. stellare* or *canicula*.

6. Scyllium capense.

Scyllium capense, (*Smith*) *Müller & Henle*, p. 11; *Duméril, Elasmobr.* p. 320.

The nasal valves are not confluent, separated from each other by a considerable interspace; they are slightly folded, but without prominent cirrus. Lower jaw with a short lateral fold commencing from the angle of the mouth; upper jaw without trace of a labial fold. Ventral fin with the posterior margin very oblique. End of the anal fin nearly opposite to the beginning of the dorsal, the length of its base being nearly twice that of the dorsal, but less than its distance from the caudal. Teeth very small, with indistinct lateral cusps. Upper parts with whitish spots and alternate darker and lighter cross bands. Lower parts uniform light-coloured. Dried examples of a nearly uniform dark brown.

Cape seas; Indian Ocean.

a–d. Stuffed, from 24 to 41 inches long. Cape seas. Presented by Sir A. Smith.—Types of the species.
e–f. Stuffed, 40 inches long. India.

7. Scyllium bürgeri.

Scyllium bürgeri, *Müller & Henle*, p. 8, pl. 2; *Schleg. Faun. Japon. Poiss.* p. 301; *Bleek. Act. Soc. Sc. Ind.-Neerl.* i. *Amboyna*, p. 69.
Halælurus bürgeri, *Gill, Ann. Lyc. Nat. Hist. New York*, vii. p. 412 (name only).

The nasal valves are not confluent, are separated from each other by a considerable interspace, and without cirrus. Angle of the mouth without, or with only a trace of, a labial fold. Teeth very small. Ventral fin with the posterior margin very oblique. End of the anal fin opposite to, or slightly in advance of, the origin of the dorsal; the length of its base is rather more than that of the dorsal, and about one-half of its distance from the caudal. Light brownish, with dark cross bands; each band spotted with brownish black; a few black spots between the bands. Lower parts immaculate.

Japanese Sea; East-Indian archipelago.

a. Half-grown. Japan. Purchased of Mr. Jamrach.
b–c. Half-grown. Formosa. From Mr. Swinhoe's Collection.
d, e. Adult. Amboyna.
f–g. Fœtus. Presented by J. Bowerbank, Esq.—Back with two longitudinal series of spines.

8. Scyllium laticeps.

Scyllium laticeps, *Duméril, Rev. et Mag. Zool.* 1853, p. 84, pl. 3. fig. 2 (head); *Elasmobr.* p. 323.
Cephaloscyllium laticeps, *Gill, l. c.* (name only).

The nasal valves are not confluent, are separated from each other by a very broad interspace, and without prominent cirrus. No labial fold. Teeth very small, tricuspid. Head very broad and depressed. End of the anal fin nearly opposite to the end of the dorsal; anal a little longer than the dorsal, the length of its base being nearly equal to its distance from the caudal. Brownish, marbled with darker.

Tasmania.

a. Adult ($0^{m}\cdot90$ long). Purchased by Mr. Schwarzschild.
b. Adult ($0^{m}\cdot90$ long): stuffed.

9. Scyllium bivium.

Scyllium bivium, (*Smith*) *Müller & Henle*, p. 8.

The nasal valves are widely separate from each other, rather small and narrow, *turned outwards and upwards*; no cirrus. Both jaws with a labial fold proceeding from the angle of the mouth for about half their length. Teeth not very small, those of the lower jaw without, or with very indistinct lateral cusps. Ventral fin with the posterior margin oblique. The second dorsal fin has a rather longer base, and is generally a little larger, than the first. End of the anal fin opposite to the origin of the dorsal; its base is rather longer than that of the dorsal, and somewhat more than one-half of its distance from the caudal. Granulations of the back of the trunk equally minute. Uniform brownish black in a dried state*.

Cape of Good Hope.

a. Type of the species, stuffed, 27 inches long. From Sir A. Smith's Collection.

10. Scyllium chilense.

Scyllium chilense, *Guichen. in Gay, Chile, Zool.* ii. p. 362.
—— bivium, *Duméril, Elasmobr.* p. 321 (not synon.).

The nasal valves are widely separate from each other, slightly folded, *with a downward twist*; no cirrus. Both jaws with a labial fold proceeding from the angle of the mouth for about half their length. Teeth very small, those of the lower jaw without lateral cusps. Ventral fin with the posterior margin rather oblique. The two dorsal fins equal. End of the anal fin opposite to the origin of the dorsal; the length of its base is equal to that of the dorsal fin, and conspicuously less than one-half of its distance from the caudal. Two bands of rather stronger granulations along the middle of the back. Back of the trunk with two, of the tail with four irregularly rhombic black transverse blotches. Upper parts with scattered small black spots besides.

Coast of Chile.

a–c. Stuffed, 21–22 inches long. Islay. Purchased of Mr. Whitely.

11. Scyllium africanum.

Squalus africanus, *Gm. L.* i. p. 1494; *Bl. Schn.* p. 129; *Lacép.* i. p. 251.
—— vittatus, *Shaw, Zool. Misc.* pl. 346.

---

* I do not understand how Müller and Henle obtained their notes on the coloration, as they had only one example for examination, the same from which I have made the diagnosis, and the only one known to exist in collections.

Scyllium africanum, *Cuv. Règne An.*; *Müll. & Henle*, p. 12, pl. 7; *Smith, Ill. Zool. S. Afr. Fish.* pl. 25. fig. 1; *Duméril, Elasmobr.* p. 321.
Squalus striatus, *Forst. Descr. An.* ed. *Licht.* p. 407.
Scyllium variegatum, *Smith, l. c.* fig. 2; *Müller & Henle*, p. 14.
—— pantherinum, *Smith, l. c.* fig. 3; *Müller & Henle*, p. 13; *Duméril, Elasmobr.* p. 322.

Nasal valves widely separate from each other, each with a prominent, shorter or longer cirrus*. A labial fold at the angle of the mouth, not extending on the upper jaw. Teeth very small, tricuspid. The second dorsal fin only half the size of the first; end of the anal fin below the middle of the second dorsal. The coloration varies.

South Africa.

Var. *α. africana* s. *striata*. Five or seven black bands along the upper parts; each band sometimes lighter in the middle.

a–g. Stuffed, from 22 to 38 inches long. Cape seas.
h. Half-grown. Cape of Good Hope.

Var. *β. variegata*. Only the black outlines of some of the dorsal bands remain; sides with indistinct small blackish spots.

i. Type of *Sc. variegatum*, 24 inches long: stuffed. Algoa Bay. From Sir A. Smith's Collection.

Var. *γ. pantherina*. Upper parts covered with irregular ring-like blackish markings.

k. Type of *Sc. pantherinum*, 27 inches long: stuffed. Algoa Bay. From Sir A. Smith's Collection.

21. PRISTIURUS.

Pristiurus, *Bonap. Faun. Ital. Pesc.*

Two dorsal fins, without spines; the first above or behind the ventrals; origin of the anal fin in advance of that of the second dorsal. A series of small, flat spines on each side of the upper edge of the caudal fin. Snout much produced, covered with a thick layer of cellular tissue, within which a gelatinous substance is secreted, escaping by numerous pores of the skin. Spiracle behind the eye. Nostrils wide, inferior, covered by a short valve. Teeth small, tricuspid.

European seas.

1. **Pristiurus melanostomus.**

Squalus catulus, *Gunner, Trondh. Selsk. Skrift.* ii. p. 249.
Haae-Gjäle, *Ström, Söndm.* i. p. 283.
Rödhaae, *Ascan. Ic.* iv. p. 5, tab. 38.
Squalus prionurus, *Otto, Conspect.* p. 5.
Scyllium artedi, *Risso, Eur. Mérid.* iii. p. 117.

---

* The cirrus extends to the labial margin not only in the examples named "*variegatum*" and "*pantherinum*," but also in some really banded specimens; generally it is shorter.

Squalus annulatus, *Nilss. Prodr.* p. 114.
Scylliorhinus delarochianus, *Blainv. Faun. Franç.* p. 74.
—— melastomus, (*Rafinesque*) *Blainv. l. c.* p. 75.
Pristiurus melanostomus, *Bonap. Faun. Ital. Pesce*; *Müller & Henle*, p. 15, pl. 7; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 375, or 3rd edit. ii. p. 479; *Duméril, Elasmobr.* p. 325.
Scyllium annulatum, *Nilss. Skand. Faun.* p. 713.
—— melastomum, *Jenyns, Man.* p. 497; *Kröy. Danm. Fisk.* iii. p. 832.
Pristiurus artedi, *Bocage & Capello, Peix. Plagiost.* p. 11.
Black-mouthed dog-fish, *Couch, Fish. Brit. Isl.* i. p. 18, pl. 3.

Nasal valves separated by a broad interspace, nearer to the mouth than to the end of the snout; a short labial fold round the angle of the mouth. Dorsal fins subequal in size, the second above the hinder part of the anal; anal fin nearly as long as the head to the first gill-opening. Upper parts with rounded darker spots of various sizes, each with a lighter margin.

European seas.

a. Adult (28 inches). North coast of Norway. Purchased of Hr. Brandt.
b–c. Adult: skins. Great Britain. From Yarrell's Collection.
d. Adult. Lisbon. Presented by the Rev. R. T. Lowe.
e–f. Adult and half-grown. Madeira. Presented by the Rev. R. T. Lowe.
g, *h*, *i*. Adult and half-grown. Madeira. Presented by J. Y. Johnson, Esq.
k. Half-grown. Nice. From Dr. Deakin's Collection.
l, *m–n*. Half-grown. Mediterranean. Purchased.

22. GINGLYMOSTOMA.

Ginglymostoma, *Müller & Henle*, p. 22.
Nebrius, *Rüppell, N. W. Fisch.* p. 62.

Two dorsal fins, without spines; the first above or behind the ventrals; the second opposite to, and somewhat in advance of, the anal. Eyes very small; spiracle minute, behind the eye. Nasal and buccal cavities confluent. The nasal valves of both sides form one quadrangular flap in front of the mouth, each being provided with a free cylindrical cirrus. An upper and lower lip, the latter not extending across the symphysis. The fourth and fifth gill-openings close together.

Two subgenera may be distinguished according to the dentition:—

α. Teeth of both jaws in many series, each with a strong median cusp, and one or two much smaller cusps on each side: *Ginglymostoma*, M. & H.—Atlantic and Indian seas.

β. Teeth of both jaws in only a few (three) series, the foremost only being in function. Each tooth has a convex, finely and equally serrated margin: *Nebrius*, Rüpp.—Indian seas.

a. GINGLYMOSTOMA.

1. **Ginglymostoma cirratum.**

Gata, *Parra*, p. 86, pl. 34. fig. 2.
Squalus cirratus, *Gm. L.* i. p. 1492; *Lacép.* i. p. 245; *Bl. Schn.* p. 128.
—— punctulatus, *Lacép.* ii. p. 120, pl. 4. fig. 3; *Bl. Schn.* p. 549.
—— punctatus, *Bl. Schn.* p. 134.
—— argus, *Bancroft, Zool. Journ.* v. p. 82.
Ginglymostoma cirratum, *Müller & Henle*, p. 23; *Duméril, Elasmobr.* p. 334.
—— fulvum, *Poey, Mem. Cub.* ii. 342, and *Repert. Fis.-nat. Cub.* 1868, p. 455.
—— caboverdianus (sic), *Capello, Jorn. Sc. Math. Phys. e Nat.* 1867, p. 167, fig. 1.

The nasal cirrhus reaches the lower lip. Angles of the dorsal, anal, and pectoral fins obtusely rounded. Length of the caudal fin one-third, and in young examples two-sevenths of the total length. Uniform brownish; young examples with scattered small, round black spots.

Tropical parts of the Atlantic.

a–b. Stuffed, 8 and 6 feet long. West Indies.
c–g. Half-grown (28 inches): stuffed. West Indies.
h. Young. South America. Presented by Sir R. Schomburgk.
i, k–l. Half-grown. St. Croix. Purchased of Mr. Stevens.
m. Half-grown. Cuba. From the Collection of the Zoological Society.
n. Half-grown.

2. **Ginglymostoma mülleri.**

? Scyllium ferrugineum, *Less. Voy. Coq. Zool.* ii. p. 95.
Ginglymostoma concolor, *Müller & Henle*, p. 22, pl. 6 (not *Rüpp.*).

The nasal cirrus reaches nearly to the labial margin. Angles of the fins pointed; the length of the caudal is about two-sevenths of the total. Uniform brownish. (*M. & H.*)

India. Attains to a length of 8½ feet.

3. **Ginglymostoma brevicaudatum.**

Günth. in Fish. Zanz. p. 141, pl. 21.

The nasal cirrus is very short, terminating at a great distance from the labial margin. Fins short, with the angles obtusely rounded; length of the caudal fin two-ninths of the total. Uniform dark brown, with minute black dots.

Zanzibar; Seychelles.

a. Type of the species, stuffed, 25 inches long. From Lieut.-Col. Playfair's Collection.
b. Skull of a large example. Seychelles. Presented by Swinburne Ward, Esq.
c. Jaws of a large example.

β. Nebrius.

4. Ginglymostoma concolor.

Nebrius concolor, *Rüpp. N. W. Fisch.* p. 62, taf. 17. fig. 2.
Ginglymostoma concolor, *Cant. Mal. Fish.* p. 395.
—— rüppellii, *Bleek. Verh. Bat. Gen.* xxiv. *Plagiost.* p. 91, or *Nat. Tyds. Ned. Ind.* iii. p. 83; *Duméril, Elasmobr.* p. 334.

The nasal cirrus reaches nearly to the lower lip. Angles of the pectoral, dorsal, and anal fins pointed. Length of the caudal fin about one-third of the total. Uniform brownish.

Red Sea; Indian Ocean and archipelago.

a. Adult (28 inches). Java. From Dr. Bleeker's Collection.
b. Adult: stuffed. Pinang. From Dr. Cantor's Collection.

23. STEGOSTOMA.

Stegostoma, *Müller & Henle*, p. 24.

Two dorsal fins, without spines; the first above the ventrals, the second in advance of the anal, which is very close to the caudal. Tail, with caudal fin, exceedingly long, half of the total length. Eyes very small, spiracle as wide as and situated behind the orbit. Nasal and buccal cavities confluent. Snout very obtuse; upper lip very thick, like a pad, bent downwards over the mouth, with a free cylindrical cirrus on each side. A well-developed labial fold round the angle of the mouth. Teeth small, trilobed, in many series, occupying in both jaws a transverse flat subquadrangular pad. The fourth and fifth gill-openings close together.

1. Stegostoma tigrinum.

Seba, iii. p. 105, tab. 34. fig. 1.
Squalus, sp., *Gronov. Mus. Ichth.* i. p. 62, and *Zoophyl.* p. 31. no. 147.
Squalus tigrinus, *Gm. L.* i. p. 1493; *Lacép.* i. p. 249; *Forst. Zool. Ind.* p. 24, pl. 13. fig. 2.
—— longicaudus, *Gm. L.* i. p. 1496.
—— fasciatus, *Bl.* tab. 113; *Bl. Schn.* p. 130.
Zebra-Shark, *Shaw, Nat. Misc.* pl. 434.
Pollee makum, *Russell, Fish. Corom.* i. pl. 18.
Scyllium heptagonum, *Rüpp. N. W. Fisch.* p. 61, pl. 17. fig. 1.
Stegostoma fasciatum, *Müller & Henle*, p. 25, pl. 17; *Cant. Mal. Fish.* p. 396; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 23; *Duméril, Elasmobr.* p. 336; *Günth. in Fish. Zanz.* p. 140.
—— carinatum, *Blyth, Journ. As. Soc. Beng.* xvi. 1847, p. 725, pl. 25 *b*. fig. 1.
Squalus cirrosus, *Gronov. Syst.* ed. *Gray*, p. 6.

Brownish yellow, with black or brown transverse bands or stripes, or with snuff-coloured rounded spots.

Indian Seas.

a. Stuffed, 6 feet long. India. Presented by T. C. Jerdon, Esq.
b–d. Adult and half-grown: stuffed. India.

e–f. Adult and half-grown. Zanzibar. From Lieut.-Col. Playfair's Collection.

g–i. Half-grown and young: stuffed. Zanzibar. From Lieut.-Col. Playfair's Collection.

k. Adult: stuffed. Ceylon. From the Collection of the Zool. Soc.

l–n. Half-grown and young. Formosa. From Consul Swinhoe's Collection.

o. Half-grown. From the Collection of Dr. van Lidth de Jeude.

p–q. Young: stuffed.

24. PARASCYLLIUM.

Parascyllium, *Gill, Ann. Lyc. Nat. Hist. New York,* 1861, p. 412.

Two dorsal fins, without spines, the first behind the ventrals; origin of the anal fin in advance of the second dorsal. Spiracle minute, below the posterior angle of the orbit. Nasal and buccal cavities confluent. Two nasal valves, each with a short cirrus. Lower lip well developed. Teeth small, lanceolate, only those of the lower jaw with indistinct lateral cusps. The four first gill-openings distant and much narrower than the last, which is approximate to the fourth and very wide.

Tasmania.

1. Parascyllium variolatum.

Hemiscyllium variolatum, *Duméril, Rev. et Mag. Zool.* 1853, p. 121, pl. 3. fig. 1, or *Elasmobr.* p. 327.

Lower lip not continuous across the symphysis of the lower jaw; mouth midway between the eye and the extremity of the snout. The two dorsal fins subequal in size, the first very distant from the root of the ventral; anal nearly entirely in advance of the second dorsal. Dark brown above, with more or less distinct black spots.

Tasmania.

a. Fine specimen, 31 inches long. Purchased of Mr. Schwarzschild.

25. CHILOSCYLLIUM.

Hemiscyllium *et* Chiloscyllium, *Müller & Henle.*

Two dorsal fins, without spines; the first above or behind the ventrals. Anal fin placed far behind the second dorsal, and very close to the caudal. Spiracle very distinct, below the eye. Nasal and buccal cavities confluent. Nasal valve folded, with a cirrus. Lower lip well developed, continuous or interrupted in the middle. Teeth small, triangular, with or without lateral cusps. The two last gill-openings close together *.

Indian and Australian seas.

1. Chiloscyllium ocellatum.

Squalus ocellatus, *Gm. L.* i. p. 1494; *Lacép.* i. p. 253; *Bl. Schn.* p. 129; *Shaw, Nat. Misc.* pl. 161.

---

* This is the case in *Hemiscyllium* as well as *Chiloscyllium.*

Hemiscyllium oculatum, *Müller & Henle*, p. 16; *Duméril, Elasmobr.* p. 326.
Scyllium ocellatum, *Blyth, Journ. As. Soc. Beng.* 1847, p. 726, pl. 25 *b.* fig. 2.

The lower labial fold is not continued across the symphysis. The first gill-opening narrower than the second, scarcely wider than the orbit. Mouth much nearer to the end of the snout than to the eye. Body with scattered round black spots; a large black, white-edged ocellus above the pectoral fin.

Australia.

a. Fine specimen. Cape York. From Hr. Dämel's Collection.
b. Half-grown. North-west Australia. From the Haslar Collection.
c–d. Half-grown. Sunday Island. Presented by J. B. Jukes, Esq.
e. Adult (33 inches): stuffed. Australia. Presented by the Earl of Derby.
f. Half-grown: stuffed. South Sea.
g–h. Half-grown: stuffed.

2. Chiloscyllium trispeculare.

Hemiscyllium trispeculare, *Richards. Voy. Ereb. & Ter. Fish.* p. 43, pl. 28, and *Ic. Pisc.* p. 5, pl. 1. fig. 2.

Scarcely specifically distinct from *Ch. ocellatum.*

The lower labial fold is not continued across the symphysis. The first gill-opening as wide as the second, and distinctly wider than the orbit. Mouth much nearer to the end of the snout than to the eye. Head and body covered with small brown spots, which on the hinder part of the trunk are arranged in small rings; some indistinct dark bands across the back; a large black white-edged ocellus (with one or two smaller ones behind) above the pectoral fin.

North-western Australia.

a. Type of the species, 22 inches long. Presented by Sir J. Richardson.

Scyllium malaisianum, Less. Voy. Coq. Zool. ii. p. 94, pl. 6, or *Scyllium freycineti*, Quoy & Gaim. Voy. Uran. Poiss. p. 192, from Waigiou, referred by Müller and Henle (and Aug. Duméril) to their *Chiloscyllium*, is evidently most closely allied to *Ch. ocellatum* and *trispeculare*; but it lacks the ocellated spots above the pectoral: with regard to the brown spots it is intermediate between the two species mentioned.

3. Chiloscyllium indicum.

Squalus, sp., *Gronov. Mus. Ichth.* i. p. 61. no. 133; *Zoophyl.* no. 150 (from a specimen in which the anal fin is cut away).
Squalus indicus, *Gm. L.* i. p. 1503; *Bl. Schn.* p. 137.
Squale dentelé, *Lacép.* i. p. 281, pl. 11. fig. 1.
Squalus gronovianus, *Lacép.* i. p. 280.
—— tuberculatus, *Bl. Schn.* p. 137.
Russell, p. 10, pl. 16 (Bokee Sorrah and Ra Sorrah).
Scyllium plagiosum, *Bennett, Life of Raffles*, p. 694.
—— ornatum, *Gray, Ill. Ind. Zool.* c. fig.

Chiloscyllium plagiosum, *Müller & Henle*, p. 17; *Cant. Mal. Fish.* p. 392; *Bleek. Verh. Bat. Gen.* xxiv. *Plagiost.* p. 17; *Duméril, Elasmobr.* p. 328; *Day, Fish. Malabar*, p. 267.
—— griseum, *Müll. & Henle*, p. 19, pl. 4 (not good).
—— tuberculatum, *Müll. & Henle*, p. 19; *Bleek. l. c.* p. 20; *Duméril, l. c.* p. 331; *Kner, Novara, Fisch.* pp. 412, 413.
Squalus caudatus, *Gronov. Syst.* ed. *Gray*, p. 8.
Scyllium hasseltii, *Bleek. l. c.* p. 19.
—— phymatodes, *Bleek. l. c.* p. 21; *Duméril, l. c.* p. 331.
Hemiscyllium malayanum, *Bleek. Nat. Tyds. Ned. Ind.* vii. p. 376 (not *Less.*).
Chiloscyllium margaritiferum, *Bleek. Ned. Tyds. Dierk.* i. p. 243; *Duméril, l. c.* p. 329 (young).
Synchismus tuberculatus, *Gill, Ann. Lyc. Nat. Hist. New York*, 1861, p. 408 (name only).

The lower labial fold is perfectly continuous. Mouth much nearer to the eye than to the extremity of the snout, which is produced, more or less obtuse. Posterior margin of the two dorsal fins convex. The first dorsal inserted behind the base of the ventrals. Sometimes one or three smooth or tubercular ridges along the back *. Coloration variable.

Indian Ocean and archipelago, from the Cape of Good Hope to Japan.

Var. *α. plagiosa. Upper parts with broad dark cross bands; each band including some round white and black spots. (Some examples with a median dorsal keel.)*

a. Stuffed, 31 inches long. China seas. Presented by General Hardwicke.
b. Young. Amoy. From Consul Swinhoe's Collection.
c, d–g. Adult and half-grown. Japan. Purchased of Mr. Jamrach.
h. Adult. Formosa. From Consul Swinhoe's Collection.

Var. *β. margaritifera. These are young examples, with black cross bands, each band including larger and smaller round white spots.*

i, k. Five inches long. China.
l–m. Four and a half and ten inches long. Japan. Purchased of Mr. Jamrach.

Var. *γ. Body with simple dark cross bands.*

n–o. Young. Vizagapatam. Presented by Captain Mitchell.
p–q. Young: stuffed. Pinang. From Dr. Cantor's Collection.
r–t. Half-grown: stuffed. India.

Var. *δ. The cross bands are breaking up into a greater number of narrower bands with dark margins.*

u. Half-grown: stuffed. Cape seas. Presented by Sir A. Smith.—Back with three very indistinct ridges.

---

* These ridges are very inconstant—sometimes very prominent and tubercular, sometimes very indistinct, sometimes only the median is visible. The pretended species "*tuberculatus*" does not even represent a variety.

v. Half-grown. Purchased of Hr. Frank.—Back with three very distinct ridges.

w. Young: skin. From Gronow's Collection.—This is the type of *Squalus indicus*.—The anal fin is cut away.

Var. *ε. phymatodes. The bands are broken up into a great number of brown spots or transverse lines, arranged in the form of bands. Three very distinct dorsal keels.*

x. Half-grown. Java. Dr. Bleeker's Collection.—One of the types of *Ch. phymatodes*.

y. Young: stuffed. Pinang. From Dr. Cantor's Collection.

Var. *ζ. obscura. Coloration uniform brown; keels on the back present or absent.*

z. Half-grown: stuffed. Cape Seas. Presented by Sir A. Smith.—*Ch. tuberculatum*.

α. Young. Vizagapatam. Presented by Captain Mitchell.

β. Half-grown: stuffed. India.

γ. Adult. Moluccas.—*Ch. obscurum*.

δ. Adult. Moluccas. From Dr. Bleeker's Collection.—Type of *Ch. hasseltii*.

ε. Adult: skin. Ceylon. From Dr. Kelaart's Collection.

ζ. Half-grown. China. Presented by Sir J. Richardson.

4. Chiloscyllium punctatum.

Chiloscyllium punctatum, *Müller & Henle*, p. 18, pl. 3; *Bleek. l. c.* p. 22; ? *Duméril, Elasmobr.* p. 330.

The lower labial fold is perfectly continuous. Mouth much nearer to the eye than to the extremity of the snout, which is produced and rather obtuse. Posterior margin of the two dorsal fins slightly concave, the postero-inferior angle being somewhat produced. Part of the base of the first dorsal is above that of the ventrals. Back smooth. Body with about ten broad dark cross bands, and sometimes with small black dots besides.

Java.

a. Thirteen inches long. Received from Dr. Bleeker with the incorrect determination "*Ch. malayanum*."

26. CROSSORHINUS.

Crossorhinus, *Müll. & Henle*, p. 21.

Two dorsal fins, without spines—the first behind the ventrals, the second in advance of the anal, which is very close to the caudal. Tail rather short. Eyes small. Spiracle a wide oblique slit, behind and below the eye. Nasal and buccal cavities confluent. Head broad, flat, with the snout very obtuse; mouth wide, nearly anterior. A free nasal cirrus; sides of the head with skinny appendages. Upper and lower lips well developed. Anterior teeth rather large, long, and slender, without lateral lobes; the lateral three-cuspid, smaller, forming a few series only. The fourth and fifth gill-openings close together.

Japanese and Australian seas.

1. Crossorhinus barbatus.

Valent. iii. p. 330, pl. 52; *Phillip, Voy. Botany Bay*, p. 285, pl. 43.
Squalus barbatus, *Gm. L.* i. p. 1493; *Lacép.* i. p. 247; *Bl. Schn.* p. 128.
—— lobatus, *Bl. Schn.* p. 137.
—— appendiculatus, *Shaw, Nat. Misc.* pl. 727.
Crossorhinus barbatus, *Müller & Henle*, p. 21, pl. 5; *Schleg. Faun. Japon. Poiss.* p. 301; *Duméril, Elasmobr.* p. 338.

About seven skinny, simple or partly bifid lobes on each side of the head, five of which are near the angle of the mouth. Very minute barbels across the chin are sometimes absent. Distance between the two dorsal fins equal to the length of the base of the first. Upper parts brown, marbled with grey; a whitish spot behind the spiracle.

Australian and Japanese seas.

a–b. Stuffed, 7 and 5½ feet long. South Australia.
c. Young. Stuffed. New Holland.
d. Half-grown. Van Diemen's Land. From the Haslar Collection.
e, f. Fine specimens. Japan.
g–h. Half-grown: stuffed. Japan. Purchased of Hr. Frank.

2. Crossorhinus tentaculatus.

Peters, Monatsber. Ak. Wiss. Berl. 1864, p. 123.

A single flat tentacle at the angle of the mouth, another on the side of the throat. Chin without barbels. Distance between the two dorsal fins much less than the length of the base of either. Back with very broad brown cross bands, the posterior encircling the tail entirely. A white spot behind the spiracle.

Australian seas.

a–b. Fine specimens. Cape York. From Hr. Dämel's Collection.
c, d. Young. Australia.

3. Crossorhinus dasypogon.

Bleeker, Arch. Néerland. 1867, p. 400.

A nearly continuous fringe of dendritic tentacles on the side of the head, from the nostril to the gill-opening. Chin with a fringe of similar tentacles. Eyes minute. Distance between the two dorsal fins equal to the length of the base of the first. A brown network, enclosing numerous small round whitish spots, covers all the upper parts. A very small white speck behind the spiracle.

Waigiou.

a. Type of the species. From Dr. Bleeker's Collection.

Fam. 6. CESTRACIONTIDÆ.

Characters of the single genus.

27. CESTRACION.

Cestracion, *Cuv.* (not *Klein*).
Heterodontus, *Blainville.*
Heterodontus, Tropidodus *et* Gyropleurodus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 489.

Two dorsal fins, with spines, the first opposite to the space between the pectorals and ventrals; the second in advance of the anal. Nostrils and buccal cavity confluent. Mouth rather narrow, the upper lip divided into seven lobes, the lower with a fold. Spiracles small, below the posterior part of the eye. Gill-openings rather narrow. Dentition similar in both jaws, viz. small obtuse teeth in front, which in young individuals are pointed and provided with from three to five cusps. The lateral teeth large, pad-like, twice as broad as long, arranged in oblique series, one series being formed by much larger teeth than those in the other series.

Pacific and East-Indian archipelago.

1. Cestracion philippi.

Port Jackson Shark, *Phillip, Voy. Botany Bay,* p. 283, c. fig.
Squale philipp, *Lacép.* i. p. 218.
Squalus phillippi, *Bl. Schn.* p. 134.
Cestracion phillipi, *Cuv. Règne Anim*; *Less. Voy. Coq. Zool.* ii. p. 97, *Poiss.* pl. 2; *Müll. & Henle,* p. 76, pl. 31; *Schleg. Faun. Japon. Poiss.* p. 304; *Strüver, Nov. Act. Acad. Carol. Leopold. Nat. Cur.* xxiii. 1864.
Heterodontus phillipi, *Blainv. Nouv. Bull. Sc.* 1816, p. 121; *Gray, Catal. Chondropt.* p. 65; *Duméril, Elasmobr.* p. 424.
Cestracion zebra, *Gray, Zool. Misc.* p. 5; *Richards. Ichth. Chin.* p. 195.
Heterodontus zebra, *Gray, Chondropt.* p. 64; *Bleek. Verh. Bat. Gen.* xxvi. *Nieu. Nalez. Japan.* p. 127, and *Act. Soc. Sc. Neerl.* i. *Amboyna,* p. 71.
Teeth: *Agass. Poiss. Foss.* iii. pl. D. figs. 11–19; *Owen, Odontogr.* pl. 10. fig. 1, pl. 11. fig. 2; and *Osteol. Catal.* i. p. 90.

Anal fin terminating at a considerable distance from the root of the caudal. Origin of the first dorsal immediately behind the root of the pectorals; supraorbital ridges low, gradually disappearing on the side of the occiput. Body with more or less distinct dark cross bands, the first of which crosses the interorbital space and the orbit. Sometimes the bands are more numerous, narrower, and more distinct (*zebra*).

Vertebræ 110: viz. 14 between the skull and the first dorsal spine, 32 between the two dorsal spines, and 64 in the remaining part of the vertebral column.

From New Zealand to Australia, the East-Indian archipelago, and Japan.

a, *b*. Large male and female specimens. New Zealand. Presented by Professor Owen.
c. Female, 42 inches long. Tasmania. Purchased of Hr. Schwarzschild.
d–e. Adult and half-grown: stuffed. South Australia.
f. Half-grown. Amboyna. From Dr. Bleeker's Collection.
g. Half-grown: stuffed. China. Presented by J. R. Reeves, Esq.
h, *i*. Adult male and young female. Japan. Purchased of Mr. Jamrach.
k–m. Young: stuffed. Japan.
n. Half-grown: skeleton. Japan.
o–q. Jaws.

2. **Cestracion quoyi.**

Cestracion quoyi, *Frémínv. Mag. Zool.* 1840, pl. 3 *.
—— pantherinus, *Valenc. in Voy. Vénus, Zool.* p. 350, pl. 10. fig. 2 *.
Heterodontus quoyi, *Duméril, Elasmobr.* p. 427.

Anal fin not reaching to the end of the caudal. The origin of the first dorsal is considerably behind the root of the pectorals. Supraorbital ridges low. Roundish blackish spots are scattered over the body and fins.

Galapagos Islands.

3. **Cestracion francisci.**

Cestracion francisci, *Girard, Proc. Ac. Nat. Sc. Philad.* 1854, vii. p. 196; and *U. S. Pac. R.R. Exped. Fish.* p. 365.
Gyropleurodus francisci, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 490.

Anal fin large, reaching to the root of the caudal. Caudal fin with an incision opposite to the extremity of the vertebral column. Supraocular ridges very compact and prominent. Small roundish black spots are spread all over the body and fins.

Bay of Monterey, California.

4. **Cestracion galeatus.**

Anal fin large, reaching to the root of the caudal. Posterior caudal lobe with the hind margin obliquely truncate, without incision. Supraorbital crests high, at least as high as the orbit, abruptly terminating behind the orbit. Origin of the first dorsal fin opposite to the root of the pectoral fin, which is very large, extending beyond the origin of the ventral fin. Ventral fin reaching beyond the spine of the second dorsal. A broad black band across the interorbital space, descending to the cheek. Neck dark-coloured. An indistinct dark cross band corresponds to each of the dorsal fins. No spots.

Australia.

a. Fine female specimen, 25 inches long. Presented by Dr. G. Bennett.

---

* The figures quoted are taken from the same example, but differ in three or four essential points, so that they might be considered to represent two distinct species.

Fam. 7. SPINACIDÆ.

Two dorsal fins; no anal. Mouth but slightly arched; a long, deep, straight oblique groove on each side of the mouth. Spiracles present; gill-openings narrow. Pectoral fins not notched at their origin.

28. CENTRINA.

Centrina, *Cuv. Règne Anim.*
Oxynotus, *Rafinesque.*

Two dorsal fins, each with a strong spine; no anal fin. Trunk rather elevated, trihedral, with a fold of the skin running along each side of the belly. Mouth narrow, with a deep groove on each side. Teeth of the lower jaw erect, triangular, finely serrated; those of the upper slender, conical, forming a group in front of the jaw. No membrana nictitans. Spiracles wide, behind the eye. Gill-openings narrow.

Mediterranean and neighbouring parts of the Atlantic.

1. Centrina salviani.

Centrina, *Rondel.* p. 384; *Salvian.* p. 157; *Gesner, De Aquat.* p. 609; *Aldrov.* p. 401; *Willughby,* p. 58, tab. B 2 and B 3.
Vulpecula, *Bellon. De Aquat.* pp. 63, 64.
Galeus centrina, *Gesner, De Aquat.* p. 1046.
Squalus, sp. no. 5, *Artedi, Synon.* p. 95; *Gen.* p. 67.
Galeus, sp. no. 7, *Klein, Miss.* iii. p. 10.
Squalus centrina, *L. Syst. Nat.* i. p. 398; *Bl. Ausl. Fisch.* i. p. 23, taf. 115; *Bl. Schn.* p. 26; *Brünn. Pisc. Mass.* p. 3; *Risso, Ichth. Nice,* p. 42.
La Mielga, *Cornide,* p. 128.
Squale humantin, *Lacép.* i. p. 213, tab. 9.
Squalus (Acanthorhinus) centrina, *Blainv. Faun. Fr.* p. 61, tab. 15. fig. 1.
Centrina salviani, *Risso, Eur. Mérid.* iii. p. 135; *Bonap. Faun. Ital. Pesc.*; *Müll. & Henle,* p. 87; *Bocage & Capello, Peix. Plagiost.* p. 32.
—— humantin, *Cloquet, Dict. Sc. Nat.* vii. p. 385, pl. 31.
Oxynotus centrina, (*Rafinesque*) *Duméril, Elasmobr.* p. 444.

A fold of the skin runs along the median line of the back forwards from the dorsal spine to the head, and is continued backwards to the second dorsal fin. Scales spiny. Ventrals opposite to the second dorsal.

Mediterranean; coasts of Portugal.

a–b. Stuffed, 24 and 27 inches long. Gibraltar.

29. ACANTHIAS.

Acanthias, sp., *Risso, Eur. Mérid.* iii. p. 131.
Acanthias, *Müll. & Henle.*

Squalus *et* Entoxychirus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 496.

Two dorsal fins, each with a spine; no anal fin. Mouth but slightly arched; a long, deep, straight, oblique groove on each side of the mouth; no labial fold along the margin of the mouth. Teeth equal in both jaws, rather small; their point is so much turned aside that the inner margin of the tooth forms the cutting edge. No membrana nictitans. Spiracles rather wide, immediately behind the eye. Gill-openings narrow.

Temperate seas of the northern and southern hemispheres.

1. Acanthias vulgaris.

'Ακανθίας γαλεὸς, *Aristot.* vi. c. 10, ix. c. 37; *Athen.* vii. p. 294.

Galeus acanthias, *Rondel.* p. 373; *Gesner, De Aquat.* p. 607; *Jonston*, i. tab. 8. fig. 5; *Aldrov.* p. 399; *Willughby*, p. 56, tab. B 5. fig. 1; *Klein, Miss.* iii. p. 8, tab. 1. figs. 5 & 6.

Mustelus spinax, *Bellon. De Aquat.* pp. 69, 70.

Squalus, sp., *Arted. Gen.* p. 66. no. 3; *Synon.* p. 94. no. 3, and *Spec.* p. 102. no. 1; *Gronov. Zoophyl.* no. 149, and *Mus. Ichthyol.* i. p. 61. no. 139.

Squalus acanthias, *L. Syst. Nat.* p. 397; *Bl.* taf. 85; *Bl. Schn.* p. 135; *Risso, Ichth. Nice*, p. 40; *Donov. Brit. Fish.* iv. p. 82; *Faber, Fisch. Isl.* p. 29; *Turt. Brit. Faun.* p. 114; *Blainv. Faun. Fr.* p. 57; *Jenyns, Man.* p. 505; *Fries och Ekstr. Skand. Fisk.* p. 187, tab. 46; *Gronov. Syst.* ed. *Gray*, p. 8.

Picked Dog-fish, *Penn. Brit. Zool.* iii. p. 88, or edit. 1812, iii. p. 183.

Spinax, *Duhamel, Pesch.* iii. p. 299, pl. 20. fig. 5.

Aiguillat, *Lacép.* i. p. 270, pl. 10. fig. 2.

Squalus fernandinus, *Molina, Hist. Chil.* p. 194.

Spinax acanthias, *Cuv. Règne An.*; *Bonap. Faun. Ital. Pesc.*; *Richards. Faun. Bor.-Amer.* p. 291; *Parnell, Werner. Mem.* vii. p. 420; *Dekay, New York Faun. Fish.* p. 359, pl. 64. fig. 210; *Ayres, Bost. Journ. Nat. Hist.* iv. p. 288.

Acanthias vulgaris, *Risso, Eur. Mérid.* iii. p. 131; *Müll. & Henle*, p. 83; *Schleg. Faun. Japon. Poiss.* p. 304, pl. 135; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 524, or 3rd edit. ii. p. 518; *Kessler. Bull. Soc. Nat. Mosc.* 1859, ii. p. 473; *Kröy. Danm. Fisk.* iii. p. 868; *Nilss. Skand. Faun. Fisk.* p. 731; *Couch, Fish. Brit. Isl.* i. p. 49, pl. 11; *Duméril, Elasmobr.* p. 437; *Bocage & Capello, Peix. Plagiost.* p. 21.

Spinax fernandezianus, *Guichen. in Gay's Chile, Zool.* ii. p. 365.

Acanthias, sp., *Richards. Voy. Ereb. & Terr. Fish.* p. 44, pl. 28. figs. 1 & 2.

Acanthias americanus, *Storer, Mem. Amer. Acad.* ii. p. 506, ix. p. 232, pl. 38. fig. 1, and *Proc. Bost. Soc. Nat. Hist.* iii. p. 270.

—— sucklii, *Girard, Proc. Ac. Nat. Sc. Philad.* 1854, p. 196, and *U. S. Pac. R.R. Exp. Fish.* p. 368.

Brain: *Sander, Sitzgsber. Ges. ntrf. Freund. Berlin*, 1868, p. 26.

Origin of the dorsal fin opposite to or behind the inner posterior angle of the pectoral. Dorsal spines without groove. Snout produced.

Temperate seas of the northern and southern hemispheres.

a, b, c. Half-grown and young. Holland. From the Collection of Dr. van Lidth de Jeude.

d. Young. Plymouth. Museum Leach.

e, f. Fœtus. Dungeness. Collected by Dr. Cunningham.
g–h. Fœtus. Ireland. Presented by the Earl of Enniskillen.
i. Adult. Dalmatia.
k–l. Young. Mediterranean.
m–r. Adult (3 feet) and half-grown: stuffed. Cape seas.
s–u. Adult: stuffed. New Holland. Presented by General Hardwicke.
v. Young. Australia. Presented by Sir J. Richardson.
w. Young: skin. From Gronow's Collection.
x. Fœtus. Presented by Commander Knocker.
y. Jaws of an adult example. From the Collection of Dr. van Lidth de Jeude.

2. Acanthias blainvillii.

Acanthias blainvillei, *Risso, Eur. Mérid.* iii. p. 133, pl. 3. fig. 6; *Müll. & Henle*, p. 84; *Duméril, Elasmobr.* p. 438; *Bocage & Capello, Peix. Plagiost.* p. 21.
Spinax blainvillii, *Bonap. Faun. Ital. Pesc.*; *Agass. Poiss. Foss.* iii. p. 62, tab. B.

Scarcely distinct from *A. vulgaris.*

Origin of the dorsal fin conspicuously in advance of the inner posterior angle of the pectoral*. Dorsal spines without groove. Upper lobe of the caudal fin without notch. Snout produced.

Temperate seas of the northern and southern hemispheres.

a. Adult. Lisbon. Presented by the Rev. R. T. Lowe.
b, c. Adult and young. Adriatic.
d. Adult. Nice. From Dr. Deakin's Collection.
e–g. Adult: stuffed. Cape of Good Hope.
h. Young. Cape of Good Hope. Presented by Sir A. Smith.
i–k. Adult. New Holland. From the Haslar Collection.
l, m. Half-grown and fœtus.

3. Acanthias uyatus.

Squalus (Acanthorhinus) infernus, *Blainv. Faun. Fr.* p. 59 (not fig.).
Spinax uyatus, (*Rafinesque*) *Bonap. Faun. Ital. Pesc.*
Acanthias uyatus, *Müll. & Henle*, p. 85; *Duméril, Elasmobr.* p. 439.

Dorsal spines with a longitudinal groove on each side. Upper lobe of the caudal fin with a notch on its lower margin near the extremity of the fin.

Mediterranean.

30. CENTROPHORUS.

Centrophorus, *Müll. & Henle.*
Centrophorus, Centroscymnus *et* Scymnodon, *Bocage & Capello.*
Machephilus, *Johnson.*

Two dorsal fins, each with a spine, which is sometimes hidden below the skin; no anal fin. Trunk elongate, without lateral folds.

---

* In stuffed examples the altered, shrunken condition of the pectoral fin is to be taken into consideration.

Mouth wide, but slightly arched; a long, deep, straight, oblique groove on each side of the mouth. Teeth of the lower jaw with the point more or less inclined backwards or outwards. Upper teeth erect, triangular, or narrow lanceolate, with a single cusp. No membrana nictitans. Spiracles wide, behind the eye. Gill-openings narrow.

European seas; Moluccas.

Several of the species have been separated from the type of the genus on account of slight modifications of the dentition. But the passage from triangular to lanceolate teeth in the upper jaw, and from reclining to erect teeth in the lower, is so gradual that these generic sections do not appear to be called for.

Synopsis of the Species.

α. Dorsal spines projecting beyond the skin.
  a. Scales with from four to six keels.
    aa. The labial grooves are very distant from each other. The length of the base of the first dorsal (without the spine) is
      one-third of the distance between the two fins. 1. *granulosus*, p. 420.
      one-half of the distance between the two fins. 2. *lusitanicus*, p. 421.
    bb. Labial grooves prolonged forwards, nearly meeting in the median line of the snout .... 3. *crepidater*, p. 421.
  b. Scales with a single median keel, leaf-shaped, pedunculate.
    aa. No median tooth in the lower jaw...... 4. *squamosus*, p. 422.
    bb. A median tooth in the lower jaw (*Machephilus*, Johns.). 5. *dumerilii*, p. 422.
  c. Scales leaf-shaped, with three strong ribs, each terminating in a point (*Scymnodon*, Bocage) .... 6. *ringens*, p. 423.
  d. Scales minute, tricuspid .... 7. *calceus*, p. 423.
β. Dorsal spines hidden beneath the skin (*Centroscymnus*, Boc.). 8. *cœlolepis*, p. 423.

α. Dorsal spines projecting beyond the skin.

1. Centrophorus granulosus.

Squalus granulosus, *Bl. Schn.* p. 135.
Acanthorhinus granulosus, *Blainv. Nouv. Bull. Sc.* 1816, p. 121.
Centrophorus granulosus, *Müll. & Henle*, p. 89, pl. 33; *Guichen. Explor. Algér.* p. 126; *Bocage, Proc. Zool. Soc.* 1864, p. 260; *Duméril, Elasmobr.* p. 447; *Bocage & Capello, Peix. Plagiost.* p. 25 (descript. pars), tab. 3. fig. 1.

The labial fold does not extend along the margins of the mouth. The distance between the nostrils is rather more than one-third of the length of the præoral portion of the snout. The lower angle of the pectoral is produced into a narrow lobe, longer in adult examples than in immature. The length of the base of the second dorsal (without the spine) is two-thirds of that of the first (without the spine); and the length of the base of the first (without the spine) is one-third of the distance between the two fins. Extremity of the ventral fins below the second dorsal spine. Scales rather smooth in adult examples, without median keel, ribbed in front. Young examples rough. Uniform brown; young examples with the extremities of the fins white.

Mediterranean and neighbouring parts of the Atlantic.

a, b–c. Female (38 inches) and young. Madeira. Presented by J. Y. Johnson, Esq.

d. Half-grown. Mediterranean. Purchased of Mr. Cutter.

A fœtus, which has been provided with a name by Dr. Bleeker (*Centrophorus moluccensis,* Act. Soc. Sc. Indo-Neerl. viii. Amboyna, xi. p. 3), proves that this genus is represented also in the East Indies. No distinctive characters can be given from a single undeveloped example which is not in good condition.

a. Type of *Centrophorus moluccensis,* Blkr. Amboyna.

2. Centrophorus lusitanicus.

Centrophorus lusitanicus, *Bocage & Capello, Proc. Zool. Soc.* 1864, p. 260, fig. 1.

—— granulosus, *Bocage & Capello, Peix. Plagiost.* p. 25 (descript. pars), and tab. 1. fig. 3.

Very similar to *C. granulosus,* but with the base of the first dorsal fin much longer, &c.

The labial fold extends a little way along the margins of the mouth. The distance between the nostrils is rather more than one-third of the length of the præoral portion of the snout. Teeth without serrature. The lower angle of the pectoral fin is produced into a tapering lobe. The length of the base of the second dorsal (without the spine) is one-half of that of the first (without the spine), and the length of the base of the first (without the spine) is one-half of the distance between the two fins. Extremity of the ventral fins below the hind part of the second dorsal fin. Scales rather smooth, without median keel, finely striated. Uniform brownish.

Coast of Portugal.

a. Male, 29 inches long. Lisbon. Presented by Prof. J. V. B. du Bocage.

3. Centrophorus crepidater.

Bocage & Capello, Proc. Zool. Soc. 1864, p. 262, fig. 3, and *Peix. Plagiost.* p. 27, tab. 2. fig. 2.

Labial groove prolonged forwards, nearly meeting in the median line of the snout. Upper teeth very small, narrow lanceolate. The distance between the nostrils is about two-fifths of the length of the præoral portion of the snout. Lower angle of the pectoral rounded, not produced. Dorsal fins short, nearly equal in length; the length of the base of the first (without the spine) is less than one-third of the distance between the two fins. Extremity of the ventral below the end of the second dorsal. Scales pedunculate, with five or six ribs each. Blackish brown, spotted with darker.

Coast of Portugal; Madeira.

a. Fine female specimen, 31 inches long. Madeira. Presented by J. Y. Johnson, Esq.

4. **Centrophorus squamosus.**

L'Ecailleux, *Brouss. Mém. Ac. Sc.* 1780, p. 675; *Lacép.* i. p. 284.
Squalus squamosus, *Gm. L.* i. p. 1502; *Bl. Schn.* p. 156.
Acanthorhinus squamosus, *Blainv. Nouv. Bull. Sc.* 1816, p. 121.
Centrophorus squamosus, *Müll. & Henle*, p. 90, pl. 34; *Bocage, Proc. Zool. Soc.* 1864, p. 260; *Duméril, Elasmobr.* p. 448; *Bocage & Capello, Peix. Plagiost.* p. 27, with figs. of scales.

The labial fold extends a little way along the margin of the upper jaw, but not along that of the lower. Teeth $\frac{32}{32}$, the upper inclined outwards, with a notch on the outer side of the base, but not on the inner; *no median tooth in the lower jaw*. The distance between the nostrils is about one-third of the length of the præoral portion of the snout. Lower angle of the pectoral fin very slightly produced. The length of the base of the second dorsal fin (without the spine) is two-thirds that of the first (without the spine); and the length of the base of the first (without the spine) is about one-third of the distance between the two fins. Extremity of the ventral fins below the middle of the second dorsal fin. *The scales are leaf-shaped, with a strong median keel, quite free, inserted in the skin by a short stalk.* Brown.

Coast of Portugal.

5. **Centrophorus dumeriiii.**

Machephilus dumerilli, *Johnson, Proc. Zool. Soc.* 1867, p. 713.

Most closely allied to *C. squamosus*. The labial fold extends a little way along the margin of the upper jaw, but not along that of the lower. Teeth $\frac{41}{29}$, the upper small, straight, triangular, with a constricted cusp standing on a broad base; *a median tooth in the lower jaw*. The distance between the nostrils is a little less than one-third of the length of the præoral portion of the snout. Lower angle of the pectoral fin very slightly produced. The length of the base of the second dorsal fin (without the spine) is two-thirds of that of the first (without the spine); and the length of the base of the first (without the spine) is nearly one-half of the distance between the two fins. Extremity of the ventral fins below the middle of the second dorsal fin. *The scales are leaf-shaped, with a strong median keel, quite free, inserted in the skin by a short stalk.* Brown, with dark spots.

Madeira.

a. Type of the species, male, 43 inches long. Presented by J. Y. Johnson, Esq.

6. Centrophorus ringens.

Scymnodon ringens, *Bocage & Capello, Proc. Zool. Soc.* 1864, p. 263, fig. 5, and *Peix. Plagiost.* p. 31, tab. 1. fig. 1.

Labial groove extending for some distance along the margins of both jaws. Upper teeth very small and narrow, lanceolate; the lower more or less erect, triangular; only the lateral are somewhat inclined backwards. The distance between the nostrils is one-half of the length of the præoral portion of the snout. Lower angle of the pectoral fin rounded, not produced. Dorsal spines feeble, but little projecting beyond the skin. Anterior dorsal fin much shorter than the second, the length of its base (without the spine) being about one-fourth of its distance from the second dorsal. Extremity of the ventral fins behind the end of the second dorsal. Scales pedunculate, each with three strong ribs, each of which terminates in a point behind. Uniform brownish black.

Coasts of Portugal.

a. Fine female specimen, 33 inches long. Presented by Prof. J. V. B. du Bocage.

7. Centrophorus calceus.

Acanthidium calceus, *Lowe, Proc. Zool. Soc.* 1839, p. 92, and *Trans. Zool. Soc.* iii. p. 19.
Centrophorus calceus, *Lowe, Proc. Zool. Soc.* 1843, p. 93.
—— crepidalbus, *Bocage & Capello, Proc. Zool. Soc.* 1864, p. 262, fig. 2, and *Peix. Plagiost.* p. 28, tab. 2. fig. 1.

The labial fold extends for some distance along the margin of the jaws. Snout spatulate, much produced, the distance between the nostrils being less than one-third of the length of the præoral portion of the snout. Lower angle of the pectoral fin rounded, not produced. The length of the bases of the two dorsal fins (without the spines) is nearly equal, and one-half of the distance between them. Extremity of the ventral fins below the middle of the second dorsal fin. *The scales are small, tricuspid,* and so minute as to give a velvety appearance to the skin.

Coast of Portugal; Madeira.

a. Female, 33 inches long. Portugal. Presented by J. V. B. du Bocage.
b, c. Females, 38 inches long. Madeira. Presented by J. Y. Johnson, Esq.

β. *Dorsal spines hidden beneath the skin*: Centroscymnus.

8. Centrophorus cœlolepis.

Centroscymnus cœlolepis, *Bocage & Capello, Proc. Zool. Soc.* 1864, p. 263, fig. 4, and *Peix. Plagiost.* p. 30, tab. 2. fig. 3; *Wright, Ann. & Mag. Nat. Hist.* 1868, ii. p. 426.

Labial groove prolonged forwards, but separated by a broad space from that of the other side. Upper teeth very small, narrow, and lanceolate. The distance between the nostrils is rather less than one-half of the length of the præoral portion of the snout. Lower angle of the pectoral rounded, not produced. Dorsal spines hidden beneath the skin. Dorsal fins short, especially the first, the length of the base of which (without the spine) is only about one-sixth of its distance from the second. Extremity of the ventral fins below the end of the second dorsal fin. Scales on the head and nape with striæ, the others smooth, with a depression at the base. Uniform blackish brown.

Coasts of Portugal; Madeira.

a. Fine male specimen. Madeira. Presented by J. Y. Johnson, Esq.

31. SPINAX.

Spinax, sp., *Cuv. Règne Anim.*
Acanthidium, *Lowe, Proc. Zool. Soc.* 1839, p. 91.
Spinax, *Müll. & Henle.*

Two dorsal fins, each with a spine; no anal fin. Mouth but slightly arched; a long, deep, straight, oblique groove on each side of the mouth. Teeth of the lower jaw with the point so much turned aside that the inner margin of the tooth forms a cutting edge. Upper teeth erect, each with a long pointed cusp and one or two small ones on each side. No membrana nictitans. Spiracles wide, superior, behind the eye. Gill-openings narrow.

European seas; West Indies.

1. Spinax niger.

Galeus acanthias s. Spinax fuscus, *Willughby*, p. 57.
Squalus, sp., *Artedi, Synon.* p. 95. no. 4, and *Gen.* p. 67. no. 4.
Squalus spinax, *L. Syst. Nat.* i. p. 398; *Gunner, Trond. Selsk. Skr.* 1763, ii. p. 313, tab. 7; *Bl. Schn.* p. 135; *Risso, Ichth. Nice*, p. 41, and *Eur. Mérid.* iii. p. 132.
Blaataske, *Ascan. Ic.* tab. 37.
Sagre, *Brouss. Mém. Ac. Sc.* 1780, p. 675; *Lacép.* i. p. 274.
Squalus gunneri, *Reinhardt, Dansk. Selsk. Förh.* iii. 1828, p. xvi.
Spinax niger, *Bonap. Faun. Ital. Pesc.*; *Agass. Poiss. Foss.* iii. p. 92, tab. B. fig. 5; *Müll. & Henle*, p. 86; *Kröy. Danm. Fisk.* iii. p. 893; *Nilss. Skand. Faun. Fisk.* p. 729; *Duméril, Elasmobr.* p. 441; *Gray, Ann. & Mag. Nat. Hist.* 1868, i. p. 312.

The scales terminate in short setiform spines, giving a villous appearance to the skin. The first dorsal fin shorter than the second, midway between the second dorsal spine and the eye. Uniform brown or black, or with a whitish longitudinal band along the side of the abdomen and of the tail. Caudal fin sometimes with a white margin.

European seas.

a. Adult. Coast of Jutland. Presented by Mr. W. Edwards.
b–d. Adult (14 inches long). Mediterranean. Purchased of Mr. Cutter.
e, f–h. Adult and half-grown. Nice. From Dr. Deakin's Collection.
i. Adult. Sicily.

2. Spinax pusillus.

Acanthidium pusillum, *Lowe, Proc. Zool. Soc.* 1839, p. 91, or *Trans. Zool. Soc.* iii. p. 19.

Spinax hillianus, *Poey, Mem. Cub.* ii. p. 340; *Repert. Fis.-nat. Cuba,* 1868, p. 454.

Scales very small, each with a minute tubercle, without any spines. The first dorsal fin much shorter than the second, midway between the second dorsal spine and the eye. Brown or black. A whitish band of demarcation sometimes separates the darker coloration of the lower parts from that of the upper.

Madeira; Cuba.

a, b, c, d, e–f, g–i, k–m. Adult examples (12 inches long). Madeira. Among them the typical examples.

This species has been confounded by Müller and Henle with *Sp. niger.*

32. CENTROSCYLLIUM.

Centroscyllium, *Müll. & Henle.*

Two dorsal fins, each with a strong spine; no anal fin. Mouth crescent-shaped; a straight oblique groove at each angle of the mouth. Teeth equal in both jaws, very small, tricuspid. No membrana nictitans. Spiracles of moderate width. Gill-openings rather narrow.

Greenland.

1. Centroscyllium fabricii.

Spinax fabricii, *Reinhardt, Dansk. Vid. Selsk. Förh.* 1828, iii. p. xvi.

Centroscyllium fabricii, *Müll. & Henle,* p. 191; *Duméril, Elasmobr.* p. 449.

Minute stellate ossifications cover the whole body. Dorsal fins short, spines strong. Root of the ventrals entirely in front of the second dorsal. Brown.

Greenland.

a. Stuffed: 29 inches long.

33. SCYMNUS.

Scymnus, sp., *Cuv. Règne An.*; *Müll. & Henle.*

Two short dorsal fins, without spine, the first at a considerable distance from the ventrals; no anal fin. Skin uniformly covered with minute scales. Mouth transverse, a deep straight groove at each angle of the mouth. Nostrils at the extremity of the snout. Upper teeth small, pointed; lower much larger, dilated, erect, triangular, not very numerous. No membrana nictitans. Spiracles wide. Gill-openings narrow.

Mediterranean and Atlantic.

1. Scymnus lichia.

Liche ou Gatte, *Brouss. Mém. Ac. Sc.* 1780, p. 677; *Duham. Pesch.* iii. p. 328.

Squalus americanus, *Gm. L.* i. p. 1503; *Bl. Schn.* p. 136.
—— liche, *Lacép.* i. p. 279, pl. 10. fig. 3.
—— nicæensis, *Risso, Ichth. Nice*, p. 43, pl. 4. f. 6.
Scymnus lichia, *Cuv. Règne An.*; *Bonap. Faun. Ital. Pesc.*; *Müll. & Henle*, p. 92; *Agass. Poiss. Foss.* iii. tab. F. fig. 7 (teeth); *Duméril, Elasmobr.* p. 452; *Bocage & Capello, Peix. Plagiost.* p. 34.
—— nicæensis, *Risso, Eur. Mérid.* iii. p. 136, pl. 2. fig. 4.
Acanthorhinus americanus, *Blainv. Faun. Fr.* p. 63, pl. 15. fig. 2.
Dalatias lichia, *Gray, Chondropt.* p. 75.

Seventeen or nineteen erect teeth* in the lower jaw, with the edges serrated. Scales minute, with a median keel, and terminating in a point. The first dorsal fin is nearer to the root of the pectorals than to that of the ventrals.

Mediterranean and neighbouring parts of the Atlantic.

a, b–c. Adult, half-grown, and young. Mediterranean. Purchased of Mr. Cutter.
d. Half-grown. Nice. From Dr. Deakin's Collection.
e. Stuffed: male, 50 inches long. Madeira. Presented by the Rev. R. T. Lowe.
f, g. Adult male and young. Madeira. Presented by J. Y. Johnson, Esq.

34. LÆMARGUS.

Læmargus, sp., *Müll. & Henle*, p. 93.
Somniosus *et* Rhinoscymnus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 264.

Fins feebly developed. Two short dorsal fins, without spine, the first at a considerable distance from the ventrals; no anal fin. Skin uniformly covered with minute tubercles. Mouth transverse; a deep straight groove at each angle of the mouth. Nostrils near the extremity of the snout. The upper teeth small, narrow, conical; the lower teeth numerous, in several series, the point so much turned aside that the inner margin forms a cutting, non-serrated edge. Jaws feeble. No membrana nictitans. Spiracles of moderate width. Gill-openings narrow.

Northern Seas.

1. Læmargus borealis.

Haa-Skierding, *Gunner, Trondh. Selsk. Skr.* 1763, ii. p. 330, tab. 10 & 11.
Squalus carcharias, *Müll. Prodr. Zool. Dan.* p. 38.
—— microcephalus, *Bl. Schn.* p. 135.
Somniosus brevipinna, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 222 (Valenciennes and consequently also Duméril quote pl. 8 as representing this shark; but this plate belongs to a very different fish, a *Carcharias*); *Storer, Report Fish. Massach.* p. 189.
Squalus borealis, *Scoresby, Arct. Reg.* i. p. 538, pl. 15. figs. 3 & 4; *Jen. Man.* p. 506.

---

* These teeth are oblique, as in "Læmargus," in young examples; normally they are in a single series; but when they are near the period of being shed, the new series appears behind the old one.

Scymnus borealis, *Flem. Brit. An.* p. 166; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 527, or 3rd edit. ii. p. 524; *Nilss. Skand. Faun. Fisk.* p. 724.
—— glacialis, *Faber, Fisch. Isl.* p. 23.
—— gunneri, *Richards. Faun. Bor.-Amer.* iii. p. 313.
Squalus norwegianus, *Blainv. Faun. Fr.* p. 61.
Scymnus micropterus, *Valenc. Nouv. Ann. Mus.* i. 1832, p. 454, pl. 20.
Læmargus borealis, *Müll. & Henle*, p. 93; *Gaimard, Voy. Isl. Groenl. Poiss.* pl. 22; *Duméril, Elasmobr.* p. 455, pl. 5. figs. 1 & 2 (teeth).
Leiodon echinatum, *Wood, Proc. Bost. Soc. Nat. Hist.* ii. p. 174.
Scymnus brevipinna, *Dekay, New York Faun. Fish.* p. 361, pl. 61. fig. 202; *Storer, Mem. Am. Acad.* ix. 1867, p. 235, pl. 38. fig. 2.
—— microcephalus, *Kröy. Danm. Fisk.* iii. p. 914; *Malmgren, Œfvers. Svensk. Vet.-Ak. Förhandl.* 1864–65, p. 536.
Squalus norvegicus, *Gronov. Syst.* ed. *Gray*, p. 8.
Greenland Shark, *Couch, Fish. Brit. Isl.* i. p. 57, pl. 13.
Læmargus brevipinna, *Duméril, l. c.* p. 456, pl. 5. figs. 3 & 4.

From 44 to 52 teeth in one of the series of the lower jaw. The first dorsal fin midway between the roots of the pectoral and ventral fins; the second commences opposite to the end of the insertion of the ventral fins. Pectorals small.

Arctic Seas; North Atlantic.—Attains to a length of 25 feet.

a. Stuffed, 7 feet long. England. Presented by Messrs. J. and C. Grove.
b. Stuffed, 6 feet long. England.
c. Jaws of an adult example.

2. Læmargus rostratus.

Scymnus rostratus, *Risso, Eur. Mérid.* iii. p. 138, fig. 7.
Læmargus rostratus, *Canestrini, Mem. Accad. Sc. Torin.* xxi. 1865, p. 364, tav. 2. figs. 2–4.

This species does not appear to have been compared directly with *L. borealis*; and therefore its characters cannot be pointed out in an exact manner. The fins, especially the pectorals, appear to be more developed. The length of the snout is one-half of the distance of the eye from the second gill-opening.

Mediterranean.

35. EUPROTOMICRUS.

Læmargus, sp., *Müll. & Henle.*
Euprotomicrus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 264.

Two dorsal fins, without spine; the first very small, at a short distance from the ventrals; the second much longer; no anal fin. Skin uniformly granular. Mouth transverse; a deep straight groove at each angle of the mouth, in which a labial fold is hidden. Nostrils near to the extremity of the snout, which is not depressed, obtusely conical. Upper teeth small, conical; the lower much larger, triangular, slightly oblique, not serrated, in moderate number. No membrana nictitans. Spiracles wide; gill-openings very narrow.

Indian Ocean.

1. Euprotomicrus labordii.

Leiche laborde, *Quoy & Gaim. Voy. Uran. Zool.* p. 197, pl. 44. figs. 1 & 2.
Scymnus bispinatus, *Quoy & Gaim. l. c.*
—— mauritianus, *Quoy & Gaim. Dict. Class. Hist. Nat. Atl.* pl. 114. fig. 2.
Læmargus labordii, *Müll. & Henle*, p. 94; *Duméril, Elasmobr.* p. 457.

Twenty-three teeth in the lower jaw. Pectorals rather short, truncated behind. The second dorsal is nearly four times as long as the first. Uniform brownish black.

Indian Ocean.

a–b. From 8 to 9 inches long. Presented by J. B. Godfrey, Esq.

36. ECHINORHINUS.

Echinorhinus, *Blainville.*
Goniodus, *Agassiz.*

Two very small dorsal fins, without spine, the first opposite to the ventrals; no anal fin. Skin with scattered large round tubercles. Mouth crescent-shaped, a labial fold round the angle of the mouth. Nostrils midway between the mouth and the end of the snout. Teeth equal in both jaws, very oblique, the point being turned outwards; several strong denticulations on each side of the principal point. No membrana nictitans. Spiracles small; gill-openings of moderate width.

Mediterranean and Atlantic.

1. Echinorhinus spinosus.

Le Bouclé, *Brouss. Mém. Ac. Sc.* 1780, p. 672; *Lacép.* i. p. 283, pl. 3. fig. 2.
Squalus spinosus, *Gm. L.* i. p. 1500; *Bl. Schn.* p. 136; *Risso, Ichth. Nice*, p. 42.
—— brucus, *Bonnat. Encycl.* p. 11.
Scymnus spinosus, *Cuv. Règne An.*; *Risso, Eur. Mérid.* iii. p. 136; *Cloq. Dict. Sc. Nat.* xxv. p. 434, pl. 28. fig. 2.
Echinorhinus spinosus, *Blainv. Faun. Fr.* p. 66; *Bonap. Faun. Ital. Pesc.*; *Müll. & Henle*, p. 96, pl. 60 (skin); *Yarrell, Brit. Fish.* 2nd edit. ii. p. 532, or 3rd edit. ii. p. 529; *Strickland, Ann. Nat. Hist.* 1840, iv. p. 315; *Cocks, Ann. & Mag. Nat. Hist.* 1850, v. p. 71; *Costa, Faun. Napol. Chondrott.* tav. 16; *Duméril, Elasmobr.* p. 459.
Goniodus spinosus, *Agass. Poiss. Foss.* iii. tab. E. fig. 13.
Echinorhinus obesus, *Smith, Ill. Zool. S. Afr. Pisc.* pl. 1.
Spinous Shark, *Couch, Fish. Brit. Isl.* i. p. 54, pl. 12.

Spiracles behind the eye, behind the vertical from the angle of the mouth. Teeth $\frac{22-26}{22-26}$. Dorsal fins close together. Each tubercle with a small spine in the centre. Brownish violet, with or without dark spots.

Mediterranean; from the English coasts to the Cape of Good Hope.

a. Stuffed, 8 feet long. Polperro.
b. Stuffed, 5 feet long. Mediterranean. Purchased of Mr. Wright.
c. Jaws of an adult example.

37. ISISTIUS.

Scymnus, sp., *Cuv. Règne An.*
Isistius, *Gill, Proc. Ac. Nat. Sc. Philad.* 1864, p. 264.
Leius, *Kner, Denkschr. Ak. Wiss. Wien,* 1865, xxiv. p. 9.

Two very small dorsal fins, without spine, the first nearly opposite to the ventrals; no anal fin. Skin uniformly granular. Mouth transverse; a deep straight groove at each angle of the mouth, the fold which covers it runs round the whole margin of the upper jaw; an upper and lower free lip besides. Nostrils nearly in front of the snout. Upper teeth small, narrow, lanceolate, the lower much larger, triangular, nearly erect, with smooth edges. No membrana nictitans. Spiracles wide, on the side of the neck. Gill-openings very narrow, in a groove.

Tropical seas.

1. **Isistius brasiliensis.**

Scymnus brasiliensis, *Quoy & Gaim. Voy. Uran. Zool.* p. 198; *Müll. & Henle*, p. 92; *Duméril, Elasmobr.* p. 453.
Squalus fulgens, *Bennett, Whaling Voy.* ii. p. 255; *G. Bennett, Gatherings of a Natur. in Austral.* p. 66.
Leius ferox, *Kner, l. c.* p. 10, taf. 4. fig. 2.

Twenty-five teeth in the lower jaw. Scales minute, granular. The first dorsal immediately in front of the ventrals. Sometimes a broad dark band across the chest.

Tropical seas.

a. Ten inches long. South Pacific. Presented by Commander Knocker.
b–c. Six inches long. Gulf of Guinea. From Tuckey's Congo Expedition.—One of these specimens still bears the mark of the umbilical cord; therefore this species must attain to a much more considerable size.
d. Young: stuffed.

Fam. 8. RHINIDÆ.

Characters of the single genus.

38. RHINA.

Rhina, *Klein*, *Pisc. Miss.* iii. p. 12.
Squatina, *Duméril.*

Body depressed, flat. Mouth anterior. Pectoral fins large, expanded in the plane of the body, with the basal portion prolonged forwards, but not grown to the head. Gill-openings rather wide, lateral, partly covered by the base of the pectoral. Spiracles wide, behind the eyes. Nostrils with skinny flaps, on the margin of the snout. Teeth conical, pointed, distant. Dorsal fins without spines, on the tail; no anal. Males with small prehensile appendages.

Temperate and tropical seas.

This genus approaches the *Batoidei.*

1. **Rhina squatina.**

Angel-fish; Monk.
Ῥίνη, *Aristot. Hist. An.* ii. c. 15; v. c. 5, 10, 11; ix. c. 37.
Squatina, *Bellon. De Aquat.* p. 78; *Rondel.* p. 367; *Gesner, De Aquat.* p. 899; *Aldrov.* p. 472; *Salvian.* p. 152, fig. 53; *Willughby*, p. 79, tab. D 3; *Jonston.* p. 23, tab. 11. fig. 7.
Squalus, sp., *Artedi, Synon.* p. 95. no. 6; *Gen.* p. 67. no. 6; *Gronov. Zoophyl.* p. 151.
Rhina, *Klein, Pisc. Miss.* iii. p. 14. sp. 1, tab. 2. figs. 5 & 6.
Angel-fish, *Borlase, Cornwall*, p. 265, tab. 26. fig. 5; *Pennant, Brit. Zool.* iii. p. 74, pl. 12, or, edit. 1812, iii. p. 130, pl. 15.
Squalus squatina, *L. Syst. Nat.* i. p. 398; *Brünn. Ichth. Mass.* p. 5; *Bl. Ausl. Fisch.* i. p. 25, taf. 116; *Bl. Schn.* p. 137; *Donov. Brit. Fish.* i. pl. 17; *Turton, Brit. Faun.* p. 114.
Angelo, *Cornide, Pec. Galic.* p. 129.
Squatine, *Duhamel, Pesch.* ix. pl. 14. figs. 1–4.
Squale ange, *Lacép.* i. p. 293, pl. 12. fig. 1.
Angel-Shark, *Shaw, Nat. Misc.* xxi. pl. 906.
Squatina lævis, *Cuv. Règne Anim.*
—— aculeata, *Cuv. Règne Anim.*
—— vulgaris, *Risso, Ichth. Nice*, p. 45; *Fleming, Brit. An.* p. 169; *Müll. & Henle, Plagiost.* p. 99, pl. 35. fig. 4 (snout); *Kröy. Danm. Fisk.* iii. p. 935; *Schleg. Faun. Japon. Pisc.* p. 305, pl. 136.
—— angelus, *Duméril, Zool. Anal.* p. 102; *Blainv. Faun. Fr.* p. 53, pl. 13. figs. 1 & 2; *Risso, Eur. Mérid.* iii. p. 139; *Jenyns, Manual*, p. 507; *Bonap. Faun. Ital. Pesce*; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 539, or 3rd edit. ii. p. 536; *Parnell, Werner. Mem.* vii. p. 421; *Gronov. Syst.* ed. *Gray*, p. 14.

Squatina lewis, *Couch, Linn. Trans.* xiv. p. 90; *Jenyns, Manual,* p. 508.
—— dumerilii, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 225, pl. 10; *Dekay, New York Faun. Fish.* p. 363, pl. 62. fig. 203; *Leidy, Proc. Ac. Nat. Sc. Philad.* 1847, p. 247.
—— fimbriata, *Müll. & Henle,* pp. 101, 192, pl. 35 (snout).
—— oculata, *Bonap. Faun. Ital. Pesc.*
—— japonica, *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan,* iv. p. 40.
Monk-fish, *Couch, Fish. Brit. Isl.* i. p. 37, pl. 17.
Rhina squatina, *Duméril, Elasmobr.* p. 464.
—— aculeata, *Duméril, l. c.* p. 465.
—— dumerilii, *Duméril, l. c.* p. 467.
—— californica, *Ayres, Proc. Calif. Ac. Nat. Sc. Philad.* 1859, p. 29, 1860, fig. 7.

The two dorsal fins subequal in size.

Temperate and tropical seas.

a. Several half-grown and young examples: skins. Firth of Forth. Purchased of Mr. Parnell.
b–c. Stuffed, 4½ and 2½ feet long. English coast.
d. Stuffed, 2½ feet long. Kingstown.
e. Young: dried. South Devon. From Mr. Yarrell's Collection.
f. Young: stuffed. Coast of France.
g. Young: skin. Holland. From Gronow's Collection.
h. Half-grown. Golden Horn. From Mr. Millingen's Collection.
i. Young. Mediterranean. Purchased of Mr. Wright.
k. Half-grown. Lanzarote. Presented by the Rev. R. T. Lowe.
l. Half-grown. Surinam. Purchased of Hr. Frank.
m–n. Half-grown. Japan. Purchased of Mr. Jamrach.
o. Young: skin. Sydney. Purchased of Mr. Cutter.
p. Stuffed, 4 feet long. Georgetown, Van Diemen's Land. Presented by R. Gunn, Esq.
q. Large specimen. California. Presented by Dr. W. O. Ayres.
r, *s*, *t*. Young. From the Haslar Collection.

Fam. 9. PRISTIOPHORIDÆ.

The rostral cartilage is produced into an exceedingly long flat lamina, armed along each edge with a series of teeth (saw).

39. PRISTIOPHORUS.

Pristiophorus, *Müll. & Henle.*

Body rather depressed and elongate. Pectoral fins with the front margin quite free, distant from the head. Gill-openings lateral, in front of the pectoral, of moderate width. Spiracles wide, behind the eye. No nictitating membrane. Nostrils inferior; a pair of long tentacles at the lowerside of the rostral lamina. Teeth small, with a conical cusp on a broad base, arranged in several series. Dorsal fins without spine, the first in front of the ventrals; no anal. Upper caudal lobe broader than the lower.

Seas of Japan and Australia.

1. Pristiophorus cirratus.

Pristis cirratus, *Latham, Trans. Linn. Soc.* ii. 1794, p. 281, tab. 26. figs. 5 & 27; *Bl. Schn.* p. 351, pl. 70. fig. 2 (cop. *Latham*).
Squalus anisodon, *Lacép.* iv. p. 680.
—— tentaculatus, *Shaw, Zool.* v. 2. p. 359, and *Nat. Misc.* p. 630.
Pristiophorus cirratus, *Müll. & Henle*, p. 98; ? *Duméril, Elasmobr.* p. 461.

Teeth of the saw very unequal in length, there being from one to four smaller ones between two larger. Scales extremely minute, with a single keel, their point not projecting. Dorsal and pectoral fins entirely covered with scales. The distance between the tentacle and nostril equals that between the nostril and the third or fourth gill-opening. Forty-two sets of teeth in the upper jaw.

Tasmania; South Australia.

a. Fine specimen, 46 inches long. Tasmania. Purchased of Hr. Schwarzschild.
b. Stuffed, 34 inches long. Tasmania. Presented by R. Gunn, Esq.
c. Young. From the Haslar Collection.
d–e. Jaws. New Holland. Presented by General Hardwicke.

2. Pristiophorus nudipinnis.

Teeth of the saw very unequal in length. Scales minute, nearly smooth, with traces of two or three keels at the base. The greater portion of the dorsal fins and of the upperside of the pectorals scaleless, naked. The distance between the tentacle and nostril is considerably less than that between the nostril and the first gill-opening. From 35 to 39 sets of teeth in the upper jaw.

Tasmania; South Australia.

a. Fine specimen, 43 inches long. Tasmania. Purchased of Hr. Schwarzschild.
b–c. Adult: stuffed. Tasmania. Presented by R. Gunn, Esq.
d. Adult: stuffed. South Australia. Purchased of Mr. Knight.
e. Young. Australia. Presented by Dr. G. Bennett.
f. Adult: stuffed. Purchased of Mr. Argent.

3. Pristiophorus owenii.

Teeth of the saw of equal length. Scales minute, pointed, with a median keel. Fins entirely covered with scales. Nostrils midway between the tentacles and the angles of the mouth. About 41 sets of teeth in the upper jaw.

Hab. —— ?

a. Thirteen inches long. Presented by H. A. Crozier, Esq.

4. Pristiophorus japonicus.

Pristiophorus cirratus, *Schleg. Faun. Japon. Poiss.* p. 305, pl. 137; *Richards. Ichth. Chin.* p. 317 (part.); *Bleek. Verh. Bat. Gen.* xxvi. *N. Nalez. Japan*, p. 128 (not *Latham*).

Teeth of the saw very unequal in length, there being from three to five smaller ones between two larger. Scales minute, with a single keel and projecting point. Dorsal and pectoral fins nearly entirely scaly, only a narrow marginal strip being naked. The distance between the tentacle and nostril is nearly equal to that between the nostril and the first gill-opening. From 52 to 58 sets of teeth in the upper jaw.

Japan.

a–b. Stuffed, 4⅔ feet long. Japan. Purchased of Mr. Whitely.
c. Half-grown. Japan. Purchased of Mr. Jamrach.
d. Half-grown. Japan.

Second Suborder. BATOIDEI.

Gill-openings ventral. In a few of the genera, which we place first, the habit is still that of the Sharks; but the body is depressed; and in the typical genera the trunk, which is surrounded by the immensely developed pectoral fins, forms a broad flat disk, with a thin and slender tail. Spiracles always present. Five pairs of gill-openings. No anal fin; dorsal fins, if present, on the tail.—Rays.

Inhabitants of all the temperate and tropical seas; some species exclusively pelagic; others entering fresh waters, or entirely limited to rivers within the tropics.

Synopsis of the Families and Genera.

Fam. 1. PRISTIDÆ.

Snout much produced, with lateral teeth, saw-like.

Saw without tentacles	1. *Pristis*, p. 436.

Fam. 2. RHINOBATIDÆ.

Trunk gradually passing into the strong and long tail, which is provided with two dorsal fins and a caudal. Pectorals not extending to the snout.

The first dorsal opposite to the ventrals	2. *Rhynchobatus*, p. 440.
Dorsal fins at a great distance behind the ventrals; anterior nasal valves not confluent	3. *Rhinobatus*, p. 441.
Anterior nasal valves confluent into a broad flap with free a margin.	4. *Trygonorhina*, p. 447.

Fam. 3. TORPEDINIDÆ.

Trunk a broad, smooth disk. Rayed dorsal and caudal fins generally present. An electric organ.

Two dorsal fins; ventrals separate; spiracles at a short distance behind the eyes	5. *Torpedo*, p. 448.
Two dorsal fins; ventrals separate; spiracles immediately behind the eyes; tail longer than the disk	6. *Narcine*, p. 452.
Two dorsal fins. Tail extremely small and short.	7. *Hypnos*, p. 453.
Ventral fins united	8. *Discopyge*, p. 453.
One dorsal fin only	9. *Astrape*, p. 454.
Dorsal fins absent	10. *Temera*, p. 455.

Fam. 4. RAJIDÆ.

Disk broad, rhombic, generally rough; tail with a longitudinal fold on each side. Pectorals extending to the snout. No electric organ. No serrated caudal spine.

Caudal fin rudimentary or absent; each ventral deeply notched. 11. *Raja*, p. 455.
Pectorals confluent in front of the snout; each ventral deeply notched. 12. *Psammobatis*, p. 470.
Caudal fin rudimentary; pectorals confluent in front of the snout; ventrals without notch .... 13. *Sympterygia*, p. 470.
Caudal fin well developed .... 14. *Platyrhina*, p. 470.

Fam. 5. TRYGONIDÆ.

Pectoral fins uninterruptedly continued to and confluent at the extremity of the snout. Tail without lateral longitudinal folds.

* *Tail without serrated spine.*

Tail long.............................. 15. *Urogymnus*, p. 471.
Tail short, with strong spinous excrescences round the basal portion. 16. *Ellipesurus*, p. 472.

** *Tail with a barbed spine.*

Tail long, finless, sometimes with a cutaneous fold below, which does not extend to its extremity.................. 17. *Trygon*, p. 472.
Tail with a rayless cutaneous fold below, which extends to its extremity. 18. *Tæniura*, p. 483.
Tail with a distinct rayed terminal fin ...... 19. *Urolophus*, p. 485.
Tail very short, without terminal fin; body at least twice as broad as long............................... 20. *Pteroplatea*, p. 486.

Fam. 6. MYLIOBATIDÆ.

Sides of the head free from the pectoral fins; snout with a detached pair of cephalic fins.

A. *Teeth large, flat, tessellated* .... **Myliobatina.**

The cephalic fins form a soft appendage in front of the snout. Teeth in several series, of which the middle contains very broad teeth. 21. *Myliobatis*, p. 488.
Only one series of very broad teeth .... 22. *Aëtobatis*, p. 492.
The cephalic fins separate, and forming a pair of lobes at the lower side of the snout .... 23. *Rhinoptera*, p. 493.

B. *Teeth very small; cephalic fins forming a pair of separate appendages in front of the snout* .... **Ceratopterina.**

Teeth in both jaws .... 24. *Dicerobatis*, p. 496.
Teeth in the lower jaw only .. .. 25. *Ceratoptera*, 497.

Fam. 1. PRISTIDÆ.

The snout is produced into an exceedingly long, flat lamina, armed with a series of strong teeth along each edge (saw) *.

1. PRISTIS.

Pristis, *Latham, Trans. Linn. Soc.* 1794, ii. p. 276.

Body depressed and elongate. Pectoral fins with the front margin quite free, not extending to the head. Gill-openings inferior, inwards of the base of the pectoral fin, of moderate width. Spiracles wide, behind the eye. No nictitating membrane. Nostrils inferior; no tentacles. Teeth minute, obtuse. Dorsal fins without spine, the first opposite or close to the base of the ventrals.

Seas of the tropical and subtropical regions.

The size of the teeth cannot be used as a specific character, as it is subject to much individual variation.

1. Pristis perrotteti.

Galeus, sp., *Klein, Pisc. Miss.* iii. p. 12, tab. 3. figs. 1 & 2.
? Pristis microdon, *Latham, Trans. Linn. Soc.* 1794, ii. p. 280, tab. 26. fig. 4 (rostrum).
Pristis perotteti, *Müll. & Henle*, p. 108; *Duméril, Elasmobr.* p. 474.
—— antiquorum, *Costa, Fauna Regn. Nap. Pesc.* pls. 8 & 9.
—— microdon, *Bleek. Verh. Bat. Gen.* xxiv. *Plagiost.* p. 54.
—— zysron, *Bleek. Nat. Tyds. Ned. Ind.* iii. p. 441 (not *Verh. Bat. Gen.*).

Dorsal fin nearly entirely in advance of the ventrals. Eighteen or twenty pairs of rostral teeth, not trenchant behind, and distant from one another, the base of each tooth being about one-third of its distance from the following. Root of the pectoral in advance of the first gill-opening; its outer angle is a right one. The second dorsal not much smaller than the first. A small lower caudal lobe.

---

* The endoskeleton of the saw consists of three, sometimes five, rarely four, hollow subcylindrical tubes, tapering towards the end, incrusted with osseous deposit, which has a granular appearance, and is perforated by small foramina. These tubes are the rostral processes of the cranial cartilage as they are observed in nearly all Rays, though shorter and much less developed. It is very difficult to remove them out of the saw in their integrity. However, one of these bodies, which is in the British Museum, became detached in an at present unexplained manner, and is perfectly intact. It was described by Dr. Gray under the name of "*Myriosteon*" (Proc. Zool. Soc. 1864, April 12), and remained a puzzle to zoologists until Prof. Kölliker, during a recent visit to London, examined it microscopically, and arrived at the conclusion that it must be "part of the endoskeleton of a Plagiostome." After the nature of this specimen had been thus determined we discovered that it is one of the lateral tubes of the saw of *Pristis.*

Tropical seas.

a. Stuffed, 4 feet long. Atlantic. From Sir A. Smith's Collection.
b. Stuffed, 4 feet long. West Indies. Purchased of Mr. Scrivener.
c, *d*. Three feet long. Chiapam. From Mr. Salvin's Collection.
e. Skin in spirits. Bandjermassing. Described as *P. zysron* by Dr. Bleeker.
f. Stuffed, 34 inches long. From the Collection of Dr. van Lidth de Jeude.
g. Young. From the Collection of Dr. van Lidth de Jeude.
h–i. Saws of half-grown specimens. Zambezi. Presented by Dr. Kirk.
k–l. Saws of half-grown specimens. From the Collection of Dr. van Lidth de Jeude.

An examination of our examples must lead to the conviction that the difference in the size of the rostral teeth cannot be used as a specific character. Specimens *c* and *d* are of nearly the same size, were obtained at the same time and at the same locality, and agree with each other in every respect except in the size of the rostral teeth, which in the one example are two lines long and four in the other. Younger examples, like specimen *f*, have still smaller teeth. Such small-toothed examples have been called *microdon* by recent authors; but it is doubtful whether they are Latham's *Pr. microdon*, as this appeared to have a much longer saw, viz. more than one-third of the total length, whilst in our examples it is considerably less than one-third. Latham states also distinctly that the second dorsal of his example was smaller than the first.

2. Pristis pectinatus.

Pristis pectinatus, *Latham, Trans. Linn. Soc.* 1794, ii. p. 278, pl. 26. fig. 2 (rostrum); *Bl. Schn.* p. 351, pl. 70. fig. 1; *Risso, Ichth. Nice*, p. 22; and *Eur. Mérid.* iii. p. 141; *Blainv. Faun. Fr.* p. 51; *Müll. & Henle*, p. 109; *Blyth, Journ. As. Soc. Beng.* 1860, xxix. p. 36; *Owen, Odontogr.* pl. 8. fig. 1; *Duméril, Elasmobr.* p. 475.
Squalus scie, *Lacép.* i. p. 286, pl. 8.
Pristis megalodon, *Duméril, Elasmobr.* p. 476, pl. 9. fig. 4.
—— acutirostris, *Duméril, l. c.* p. 479.
—— occa, *Duméril, l. c.* p. 479.
—— leptodon, *Duméril, l. c.* p. 480.
—— brevirostris, *Duméril, l. c.* p. 480.

Origin of the dorsal fin opposite to that of the ventrals. From 24 to 32 pairs of rostral teeth, which are generally long and strong, but sometimes rather short and feeble; the anterior are placed close to each other, the distance between them not being more than twice the base of a tooth. The three hindmost teeth are twice as remote from one another as the anterior. The second dorsal fin is scarcely smaller than the first. No lower caudal lobe.

Tropical seas.

a. Stuffed, 12½ feet long.
b. Stuffed, 30 inches long. West Indies.
c. Stuffed, 29 inches long. Mexico.
d. Stuffed, 32 inches long. Calcutta. Presented by E. Blyth, Esq.
e. Stuffed, 6½ feet long. Cape of Good Hope.
f–h. Stuffed, 28 inches long.
i, k, l, m–n. Fœtus. From the Collection of Dr. van Lidth de Jeude.
o. Saws of various adult and half-grown examples, the longest being 4 feet long.

3. Pristis antiquorum.

? Squalus pristis, *L. Syst. Nat.* i. p. 401.
Vivelle, *Duham. Pesch.* ii. pl. 25. figs. 3–5.
Pristis antiquorum, *Latham, Trans. Linn. Soc.* 1794, ii. p. 277, pl. 26. fig. 1; *Müll. & Henle*, p. 105, pl. 60 (mouth); *Duméril, Elasmobr.* p. 473.
—— serra, *Bl. Schn.* tab. 70.
—— granulosa, *Bl. Schn.* p. 351.
—— canaliculata, *Bl. Schn.* p. 351.
Pristibatis antiquorum, *Blainv. Faun. Fr.* p. 50.

Origin of the dorsal fin opposite to that of the ventrals. From 16 to 20 pairs of rostral teeth, nearly equidistant, stout, and provided with a cutting anterior edge. Caudal fin without lower lobe.

Mediterranean and Atlantic.

a. Numerous saws from individuals of different ages, the longest being 5 feet long *.

4. Pristis zysron.

Pristis zysron, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 55 (not *Nat. Tyd. Ned. Ind.* 1852).
—— dubius, *Bleek. l. c.* p. 56, or *Nat. Tyds. Ned. Ind.* v. p. 459; *Duméril, Elasmobr.* p. 478.

Origin of the dorsal fin above the middle of the root of the ventrals. From 26 to 32 pairs of rostral teeth †; the anterior are placed close together, the distance between them not being more than twice the base of a tooth. The three hindmost teeth are thrice as remote from one another as the anterior. The second dorsal fin is not smaller than the first, and its posterior lobe extends nearly to the root of the caudal. No lower caudal lobe.

East Indies.

a. Stuffed, 40 inches long. Ceylon. From Dr. Kelaart's Collection.
b. Stuffed, 40 inches long. Amboyna. Purchased of Hr. Frank.
c. Thirty-four inches long. Amboyna. From Dr. Bleeker's Collection.

---

* It must be remarked that the determination of isolated rostra is not always certain; there is no possibility of distinguishing those of *P. antiquorum* from those of *P. perrotteti*.

† As in almost every other species of this genus, the size and length of these teeth is variable; they are sometimes as small as in the "*microdon*" form of *P. perrotteti*, and sometimes as long as in the "*megalodon*" form of *P. pectinatus*.

d–e. Stuffed, 6 feet and 2½ feet long. Purchased of Mr. Stevens.
f. Saws of various adult and half-grown examples, the longest being 5 feet long.

5. Pristis cuspidatus.

Mature:—

Pristis cuspidatus, *Latham, Trans. Linn. Soc.* 1794, ii. p. 279, pl. 26. fig. 3 (rostrum); *Bl. Schn.* p. 351; *Müll. & Henle*, p. 107; *Duméril, Elasmobr.* p. 476.
—— semisagittatus, *Cant. Mal. Fish.* p. 407.

Immature:—

Yahla, *Russell*, i. p. 8, pl. 13.
Pristis semisagittatus, *Shaw, Zool.* v. 2. p. 361; *Müll. & Henle*, p. 108, pl. 60 (mouth); *Cant. l. c.*; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 53; *Duméril, Elasmobr.* p. 477; *Day, Fish. Malabar*, p. 272.

Dorsal fin situated entirely behind the root of the ventrals. From 25 to 34 pairs of broad rostral teeth, which have a cutting edge in front and behind, and in young specimens are provided with a more or less distinct barb on the hinder edge (*semisagittatus*). The rostrum is toothless for a considerable distance from its base. Dorsal fins equal in size, produced into a long pointed posterior lobe; caudal fin with a distinct lower lobe.

East Indies.

a. Stuffed, 4 feet long. Pinang. From Dr. Cantor's Collection.
b. Stuffed, 4 feet long. India. Presented by T. E. Boileau, Esq.
c. Stuffed, 4 feet long. India.
d, e. Young. East-Indian archipelago.
f–i. Young: stuffed.
k. Rostrum of adult. Tenasserim. Presented by J. D. C. Packman, Esq.
l. Rostrum. From the Collection of Dr. van Lidth de Jeude.
m. Head of young: dried. Bengal. Presented by General Hardwicke.
n–q. Saws of adult and half-grown specimens.

Fam. 2. RHINOBATIDÆ.

Tail strong and long, with two well-developed dorsal fins; a caudal and a longitudinal fold on each side. Disk not excessively dilated, the rayed portion of the pectoral fins not being continued to the snout. No electric organ.

2. RHYNCHOBATUS.

Rhina, sp., *et* Rhinobatus, sp., *Bl. Schn.*
Rhina *et* Rhynchobatus, *Müller & Henle.*
Rhamphobatis *et* Rhynchobatus, *Gill.*

Body depressed. Pectoral fins with the front margin quite free, not extending to the head. Gill-openings inferior, inwards of the base of the pectoral, narrow. Spiracles wide, behind the eye. No nictitating membrane. Nostrils inferior, oblique, wide slits. Teeth obtuse, granular, the dental surfaces of the jaws being undulated. Dorsal fins without spine, the first opposite to the ventrals. Caudal with the lower lobe well developed.

Indian Ocean and archipelago to China.

1. Rhynchobatus ancylostomus.

L'Endormie (*Seychelles*).
Rhina ancylostomus, *Bl. Schn.* p. 352, tab. 72; *Gray, Ill. Ind. Zool.*; *Agass. Poiss. Foss.* iii. p. 82, tab. H. figs. 3 & 4; *Richards. Ichth. Chin.* p. 195; *Müll. & Henle*, p. 110; *Owen, Odontogr.* pl. 23; *Cantor, Mal. Fish.* p. 409; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 56.
Rhamphobatis ancylostomus, *Gill, Ann. Lyc. Nat. Hist. New York*, 1861, vii. p. 408.

Snout very broad and obtuse, with semicircular outline. Large compressed tubercles form longitudinal ridges, one on each side of the upper part of the head, and one on the median line of the trunk. An incomplete series of smaller tubercles round the front margin of the eye and below the spiracle. Two short series of small tubercles on each side of the trunk may be regarded as the continuations of those on the head. Dental surface of both jaws deeply undulated.

East Indies.

a. Adult male: stuffed, 6 feet long. Madras. Presented by T. C. Jerdon, Esq.

b. Young: stuffed. China. Presented by J. R. Reeves, Esq.

c. Jaws of a large example. Seychelles. Presented by Swinburne Ward, Esq.
d. Jaws of a large example. Pinang. From Dr. Cantor's Collection.
e. Jaws of a large example.

2. Rhynchobatus djeddensis.

Rhinobatus, *Duhamel, Pesches*, ii. pl. 15. figs. 1 & 2.
Raja djiddensis, *Forsk. Descr. Anim.* p. 18.
Raie bokhat, *Lacép.* i. p. 139.
Raie rhinobate, *Lacép.* i. p. 145, pl. 6. fig. 3.
Rhinobatus lævis, *Bl. Schn.* p. 354, pl. 71; *Schleg. Faun. Japon. Poiss.* p. 306, pl. 139.
—— djidsensis, *Bl. Schn.* p. 356.
Walawah Tenkee, *Russell*, i. p. 6, tab. 10.
Rhinobatus djeddensis, *Rüpp. Atl. Fisch.* p. 54, tab. 14. fig. 1; *Benn. in Life of Raffles*, p. 693.
—— duhameli, *Blainv. Faun. Fr.* p. 48.
Rhynchobatus lævis, *Müll. & Henle*, p. 111; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 58; *Duméril, Elasmobr.* p. 483.
—— djeddensis, *Cant. Mal. Fish.* p. 412; *Day, Fish. Malab.* p. 273.

Snout narrowed, prolonged, and pointed. The series of tubercles are arranged as in *Rh. ancylostomus*, but the tubercles are very small. Dental surface of both jaws slightly undulated.

Indian Ocean and archipelago.

a. Adult female: stuffed, six feet long.
b. Half-grown: stuffed. Red Sea. Purchased of Dr. Rüppell.
c. Young. Zanzibar. Presented by Lieut.-Col. Playfair.
d. Skin, in spirits, of an adult female (5 feet long). Seychelles. From Prof. E. P. Wright's Collection.
e. Young: stuffed. Sumatra. From the Collection of Sir St. Raffles.
f. Young: stuffed. East-Indian archipelago. From the Collection of Dr. van Lidth de Jeude.
g. Young: stuffed. India. Presented by T. E. J. Boileau, Esq.
h. Young. From the Haslar Collection.
i–k. Jaws of adult examples.

3. RHINOBATUS*.

Rhinobatus, sp., *Bl. Schn.*
Syrrhina *et* Rhinobatus, *Müll. & Henle.*

Body depressed, gradually passing into the tail. Cranial cartilage produced into a long rostral process, the space between the process and pectoral fin being filled by a membrane. Spiracles wide, behind the eye. Nostrils oblique, wide; anterior nasal valves not confluent. Teeth obtuse, with an indistinct transverse ridge. Dorsal fins without spine, both at a great distance behind the ventral fins. Caudal fin without lower lobe.

---

* 1. Rhinobatus productus, *Girard, Proc. Ac. Nat. Sc. Philad.* 1854, p. 196, and *U. S. Pac. R. R. Exped. Fish.* p. 370.
2. —— jaram, *Montrouzier, in Ann. Soc. Agric. Hist. Nat. Lyon*, 1856, p. 220.—Woodlark Island (Louisiade archipelago).

Tropical and subtropical seas.

The passage from *Rhinobatus* proper (species with a narrow anterior nasal valve) to *Syrrhina* (species with a broad anterior nasal valve) is so gradual that these groups cannot be maintained as subgenera. Some of the species which ought to have been placed in *Syrrhina* have been referred to *Rhinobatus* by Müller and Henle.

1. Rhinobatus thouini.

Raie thouin, *Lacép.* i. p. 134, pl. 1. figs. 3–5; *Shaw, Zool.* v. 2. p. 318, pl. 147. fig. 2.
Rhinobatus thouini, *Müll. & Henle,* p. 120; *Duméril, Elasmobr.* p. 500, pl. 10. fig. 2 (snout).
—— ligonifer, *Cant. Mal. Fish.* p. 415, pl. 14; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 59.

Anterior nasal valve not dilated laterally. Nostril very long, its length being more than the space between the inner angles of the nostrils. Snout terminating in a long narrow cartilaginous appendage. Mouth straight. Skin coarsely granular; a series of compressed spines along the median line of the back; similar spines on the orbital margin and shoulder. Rostral ridges confluent, narrow.

East-Indian archipelago.

a. Half-grown. Pinang. From Dr. Cantor's Collection.
b. Half-grown: skin. Pinang. From Dr. Cantor's Collection.
c. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.

2. Rhinobatus halavi.

Raja halavi, *Forsk. Descr. An.* p. 19.
Rhinobatus halavi, *Rüpp. Atl. Fisch.* p. 55, tab. 14. fig. 2; *Müll. & Henle,* p. 120; *Guichen. Explor. Algér. Poiss.* p. 129; *Duméril, Elasmobr.* p. 496.

Anterior nasal valve not dilated laterally. Snout rather produced, the distance between the outer angles of the nostrils being contained about once and three-fifths in that between the mouth and the end of the snout. Mouth straight. Back covered with distinct rough tubercles, and with a distinct series of large tubercles along the median line. Some distinct spinous tubercles in front of the eye and on the shoulder. The two rostral ridges separated at the base by a broad triangular groove, but confluent along the middle third of their length.

From the Mediterranean to the sea of China.

a. Half-grown. River Bonny (West Africa). Purchased of Mr. J. Wood.
b. Adult female: stuffed. Gambia. Purchased.
c. Adult male: stuffed. Red Sea. Purchased of Dr. Rüppell.
d. Adult female: stuffed. China.
e. Adult female: stuffed. From the Collection of the Zoological Society.
f. Half-grown male. From the Haslar Collection.

3. Rhinobatus granulatus.

Rhinobatus rhinobatus, *Bl. Schn.* p. 353.
—— granulatus, *Cuv. Règne Anim.*; *Müll. & Henle*, p. 117, pl. 38; *Blyth, Journ. As. Soc. Bengal*, 1860, xxix. p. 36; *Duméril, Elasmobr.* p. 493.
—— armatus, *Gray, Ind. Zool.* c. fig.; *Müll. & Henle*, p. 119; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 60, or *Nat. Tyds. Ned. Ind.* iii. p. 85; *Duméril, l. c.* p. 494.
—— typus, *Bennett, in Life of Raffles*, p. 694.

Scarcely distinct from *Rh. halavi.*

Anterior nasal valve not dilated laterally. Snout produced, the distance between the outer angles of the nostrils being contained about once and two-thirds in that between the mouth and the end of the snout. Mouth straight. Back covered with very distinct rough tubercles, and with a series of large compressed spines along the median line. Some distinct spinous tubercles on the orbital margin and on the shoulder. The two rostral ridges are narrow, and united nearly from the base.

East Indies; Australia.

a. Female, 7 feet long: stuffed. India. Presented by J. Miller, Esq.
b–e. Adult and half-grown: stuffed. India. Purchased of Mr. Argent.
f. Half-grown. India. Presented by General Hardwicke.
g. Young: stuffed. Sumatra. From Sir St. Raffles's Collection.—Type of *Rh. typus.*
h. Half-grown. Cape York (N. Australia). Purchased of Hr. Dämel.
i–l. Adult and half-grown: stuffed.
m. Jaws of a very large example (15 inches broad). India. Presented by T. E. J. Boileau, Esq.

This species has been distinguished from *Rh. halavi* by the relative length of the nostrils and the internasal space. I do not think that any value is to be attached to slight differences of this kind, and therefore I have attempted to fix these species by the arrangement of the rostral ridges and by the difference of the dorsal tubercles. However, if these species, *Rh. obtusus* included, had not been distinguished by my predecessors, I should have preferred to regard them as one only.

Rhinobatus philippi, Müll. & Henle, p. 119, pl. 39, does not appear to be specifically distinct from *Rh. granulatus.*

4. Rhinobatus obtusus.

Müll. & Henle, p. 122, pl. 37. fig. 2; *Blyth, Journ. As. Soc. Beng.* 1860, xxix. p. 37; *Duméril, Elasmobr.* p. 493.

Scarcely distinct from *Rh. halavi.*

Anterior nasal valve not dilated laterally. Snout somewhat obtuse, the distance between the outer angles of the nostrils being about two-thirds of that between the mouth and the end of the snout. Mouth straight. Back covered with very distinct rough scales, which become larger towards the median line of the back, there not being a median series of tubercles. No distinct spines at the eye and shoulder. The two rostral ridges much divergent behind, and confluent in the anterior third of their length.

East Indies.

a. Stuffed, 30 inches long. East Indies. Purchased of Mr. Argent.

5. Rhinobatus undulatus.

Puraque, *Marcgr.* p. 151 (cop. by *Willughby*, p. 80, tab. D 5. fig. 2); *Jonston*, *De Pisc.* p. 201, tab. 36. fig. 9.
Rhinobatus electricus, *Bl. Schn.* p. 356.
—— undulatus, *Olfers*, *Torped.* p. 22; *Müll. & Henle*, p. 121, pl. 40; *Casteln. An. Am. Sud*, *Poiss.* p. 100; *Duméril*, *Elasmobr.* p. 498; *Kner*, *Novara*, *Fisch.* p. 417.
—— glaucostictus, *Olfers*, *l. c.*
—— marcgravii, *Henle*, *Narcin.* p. 34.

Anterior nasal valve dilated into a very narrow lateral fold, scarcely extending beyond the nasal margin*. Snout produced, the distance between the outer angles of the nostrils being rather more than one-half of that between the mouth and the end of the snout. Mouth straight. Back minutely granular, nearly smooth, with a series of small, polished, depressed spines along the median line; similar spines on the orbital margin and on the shoulder. The two rostral ridges are narrow, and separated by *a very narrow* groove in their entire length.

South America; Mediterranean (?).

a. Stuffed, 20 inches long. Mediterranean (?).
b. Half-grown. Bahia. From Dr. Wucherer's Collection.

Rhinobatus horkelii (Müll. & Henle, p. 122, pl. 41; Casteln. An. Am. Sud, Poiss. p. 100; Duméril, Elasmobr. p. 499), from Bahia, appears to be most closely allied to *Rh. undulatus*; but it has not a white snout like this latter species.

I am also inclined to regard *Rhinobatus cemiculus* (Geoffr. St.-Hil. Descr. Eg. Poiss. p. 224, pl. 27. fig. 3; Müll. & Henle, p. 118; Duméril, Elasmobr. p. 495), from the Mediterranean (and the Red Sea?), as identical with *Rh. undulatus*, as the difference in the distance of the nostril from the lateral profile of the snout is not a reliable character.

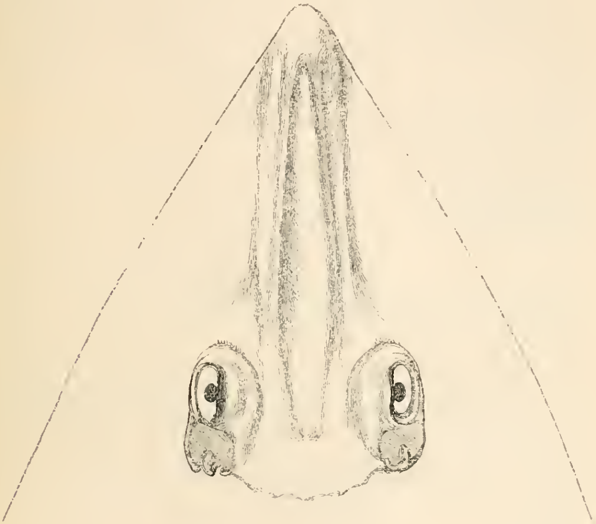
6. Rhinobatus leucorhynchus.

Günth. Proc. Zool. Soc. 1866, p. 604, and *Trans. Zool. Soc.* 1868, p. 490.

Anterior nasal valve dilated into a very narrow lateral fold, scarcely extending beyond the nasal margin. Length of the nostril more than its distance from the outer profile of the head, or than the distance between the inner angles of the nostrils, but much less than the length of the mouth, which is nearly straight. Snout rather produced, the distance between the outer angles of the nostrils being two-thirds of that between the mouth and the end of the snout. Back nearly smooth, with a series of small, polished, depressed spines along the median line. Similar spines on the orbital margin and on the shoulder. The two rostral ridges are narrow and separated by a *very broad* groove in their entire length. Snout white, as usual.

---

* First approach to *Syrrhina*.



Pacific Coast of Central America.

a. Type of the species. Presented by Capt. Dow.

7. Rhinobatus bougainvillii.

Rhinobatus (Syrrhina) bougainvillii, *Müll. & Henle*, p. 117; *Duméril, Elasmobr.* p. 491, pl. 10. fig. 1 (mouth).

The anterior nasal valve is not continued across the internasal space, but extends to the inner angle of the nostril. Snout rather produced. Mouth strongly arched, the median teeth being smaller than the lateral. Skin nearly smooth, with a series of samll tubercles along the middle of the back.

Hab. ——?

8. Rhinobatus schlegelii.

Rhinobatus schlegelii, *Müll. & Henle*, p. 123, pl. 42; *Richards. Ichth.*

China, p. 195; *Schleg. Faun. Japon. Poiss.* p. 207; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. p. 41.
Rhinobatus hynnicephalus, *Richards. Ichth. Chin.* p. 195.

The anterior nasal valve is slightly continued towards the median line by a short fold*, which is far from reaching that of the other side. The distance between the inner angles of the nostrils is rather less than the length of a nostril. Snout produced, narrower in young and male specimens than in adult females. Mouth nearly straight; the teeth in the lower jaw are equal in size. Upper parts finely granular, nearly smooth, with scarcely a trace of minute tubercles along the median line of the back.

Japanese and Chinese seas.

a, *b*. Adult female (28 inches) and young. Japan. Purchased of Mr. Jamrach.
c. Adult male (30 inches): stuffed. Japan.
d–e. Half-grown. Formosa. From Consul Swinhoe's Collection.

9. Rhinobatus banksii.

Rhinobatus (Syrrhina) banksii, *Müll. & Henle*, pp. 123, 192; *Duméril, Elasmobr.* p. 490.

The anterior nasal valve is continued towards the median line by a short fold, which, however, is far from reaching that of the other side. The distance between the inner angles of the nostrils is more than the length of a nostril. Snout produced. Mouth arched; the median teeth of the lower jaw larger and more prominent than the lateral. A series of small tubercles along the middle of the back, and two short rows on each shoulder.

Australia.

10. Rhinobatus columnæ.

Rhinobatus s. Squatinoraja, *Colonna, Phytobosanos*, tab. 27; *Willughby*, p. 79, tab. D 5. fig. 1.
Rhinobatus (Syrrhina) columnæ, *Müll. & Henle*, p. 113; *Bonap. Faun. Ital. Pesce*; *Costa, Faun. Regn. Nap. Chondrott.* pl. 10; *Duméril, Elasmobr.* p. 486.
—— (——) annulatus, *Müll. & Henle*, p. 116; *Smith, Ill. Zool. S. Afr. Pisc.* pl. 16; *Pappe, Edible Fish*, p. 32; *Duméril, l. c.* p. 487; *Kner, Novara, Fisch.* p. 416.
Raja rhinobatus, *Gronov. Syst.* ed. *Gray*, p. 10.
Rhinobatus (Syrrhina) polyophthalmus, *Bleek. Verh. Bat. Gen.* xxvi. *N. Nalcz. Japan*, p. 129, or *Nat. Tyds. Ned. Ind.* vi. p. 423; *Act. Soc. Sc. Indo-Neerl.* iii. *Japan*, iv. tab. 4.

The anterior nasal valve is continued towards the median line by a fold which nearly meets that of the other side. Snout rather produced, the distance between the external angles of the nostrils being two-fifths of the distance of the mouth from the end of the snout. Cleft of the mouth straight, longer than the nostril. The upper rostral ridges convergent in front. Back very finely granular, with a median series of very small tubercles. Young examples with a white snout.

---

* This appears to have been overlooked by Müller and Henle, who ought to have referred this species to the subgenus *Syrrhina*.

Mediterranean; Atlantic; Indian Ocean.

a. Female: stuffed, 40 inches long. Cape of Good Hope.
b. Half-grown male. Port Natal. Purchased of Mr. Ayres.
c. Adult male. Zanzibar. Presented by Lieut.-Col. Playfair.
d. Adult male; stuffed. Zanzibar. Presented by Lieut.-Col. Playfair.

11. Rhinobatus blochii.

Rhinobatus (Syrrhina) blochii, *Müll. & Henle*, p. 115, pl. 37. fig. 1; *Duméril, Elasmobr.* p. 488.

The anterior nasal valve is continued towards the median line by a fold which nearly meets that of the other side. Snout rather short, the distance between the external angles of the nostrils being more than one-half of the distance of the mouth from the end of the snout. Cleft of the mouth straight, longer than the nostril. The upper rostral ridges distant from each other behind, and convergent in front. Back finely granular, with very distinct tubercles along the median line. Young examples with a white snout, and with scattered round whitish spots.

Cape of Good Hope.

a–b. Females, stuffed, 3 feet long. Cape of Good Hope.
c. Young male. Cape of Good Hope.

12. Rhinobatus brevirostris.

Rhinobatus (Syrrhina) brevirostris, *Müll. & Henle*, p. 114, tab. 36; *Casteln. An. Am. Sud, Poiss.* p. 100; *Duméril, Elasmobr.* p. 489.

The anterior nasal valve is continued towards the median line, nearly meeting that of the other side; it partly covers the inner angle of the nostril. Snout short, the distance between the external angles of the nostrils being more than one-half of the distance of the mouth from the end of the snout. Cleft of the mouth straight, longer than the nostril. The upper rostral ridges convergent in front. Dorsal parts of the trunk with numerous small tubercles or prickles. A series of rather large and obtuse tubercles along the median line of the back; two short rows of similar tubercles on each shoulder.

Brazil.

a. Stuffed: female, 19 inches long.—One of the typical examples (see Müll. & Henle, p. 115; named "*Platyrhina sinensis*" in Gray's Chondropter. p. 98).
b. Fine specimen. Brazil. Presented by Prof. Kölliker.

4. TRYGONORHINA.

Trygonorhina, *Müll. & Henle.*

This genus differs from *Rhinobatus* only in the form of the anterior nasal valves, which are broad, confluent into a broad quadrangular flap with a free margin overhanging the mouth.

Australia.

1. Trygonorhina fasciata.

Müll. & Henle, p. 124, taf. 43; *Duméril, Elasmobr.* p. 502.

Snout rather short, the distance between its extremity and the mouth being not much more than the distance between the outer angles of the nostrils. A series of obtuse distant tubercles along the median line of the back; some similar tubercles above the eye and on the shoulder.

Southern Australia.

a. Fine adult female specimen. Tasmania. Purchased of Mr. E. Gerrard.
b–c. Adult female, 3½ feet long, and half-grown: stuffed. South Australia.
d. Adult male. New South Wales. From Mr. Krefft's Collection.
e. Young male. Sydney.
f–g. Adult male and female: stuffed. Australia.
h. Adult male. Australia.
i. Half-grown female. From the Haslar Collection.

Fam 3. TORPEDINIDÆ.

The trunk is a broad, smooth disk; tail with rayed dorsal (absent in *Temera*) and caudal fins, and a longitudinal fold along each side. Anterior nasal valves confluent into a quadrangular lobe. An electric organ composed of vertical hexagonal tubes between the pectoral fins and the head.

5. TORPEDO*.

Torpedo, *Duméril, Zool. Analyt.* 1806, p. 102.
Narcobatis, *Blainville, Faun. Franç.* 1816.

Tail very distinct from the subcircular disk, with a fold on each side. Body entirely naked. Two dorsal fins on the tail, without spine; caudal well developed; ventral fins separate. Nasal valves confluent into a quadrangular valve. Teeth pointed. Spiracles at a short distance behind the eyes. An electric apparatus between the head and pectoral fins.

---

* 1. Torpedo occidentalis, *Storer, Mem. Am. Ac.* ii. p. 516, ix. 1867, p. 247 pl. 39. fig. 15, and *Proc. Bost. Soc. Nat. Hist.* ii. p. 71.—United States.

2. —— sinus persici, *Kaempfer, Amœn. Exot.* p. 509; *Duméril, Elasmobr.* p. 506.—Red Sea.

3. —— chilensis, *Guichen. in Gay, Chile, Zool.* ii. p. 368.—Chile.

Mediterranean, Atlantic, and Indian Ocean.

We refer for the extremely numerous publications on the anatomy and physiology of the electric organ to Carus and Engelmann, Bibliotheca Zoologica, ii. 1861, pp. 1047–1049.

1. Torpedo hebetans.

Torpedo hebetans, *Lowe, Trans. Zool. Soc.* ii. (1841) p. 195.
—— nobiliana, *Bonap. Faun. Ital. Pesc.*; *Müll. & Henle*, p. 128; *Yarr. Brit. Fish.* 2nd edit. ii. p. 546, or 3rd edit. ii. p. 544; *Duméril, Elasmobr.* p. 512.
—— walshii, *Thompson, Ann. Nat. Hist.* 1840, v. p. 292, or *Nat. Hist. Irel.* iv. p. 256.
? Torpedo emarginata, *M'Coy, Ann. Nat. Hist.* 1841, vi. p. 407.
Torpedo nigra, *Guichen. Explor. Algér. Poiss.* p. 131, pl. 8.
Torpedo, *Couch, Fish. Brit. Isl.* i. pl. 30.

Spiracles not fringed; their distance from the eyes is but little more than their own diameter. The first dorsal fin is twice as large as the second, and situated nearly entirely behind the root of the ventrals. Mouth crescent-shaped. Uniform black above, or with small white dots.

Mediterranean and Atlantic.

a. Young. Madeira. Presented by the Rev. R. T. Lowe.—Type of the species.
b. Adult: skin. Purchased of Mr. Parnell.
c–d. Adult: skins. Purchased of Mr. Yarrell.
e. Adult: skin. Plymouth. Presented by Lieut. H. F. Spence, R.N.

2. Torpedo narce.

Νάρκη, *Aristot. Hist. Anim.* ii. c. 13, 15; v. c. 5, 11; vi. c. 10, 11; ix. c. 37; *Ælian. Nat. Animal.* i. c. 36; v. c. 37; ix. c. 14; *Athen.* lib. vii.
Torpedo, *Plin. Hist. Mund.* ix. c. 16, 24, 42, & 51; xxxii. c. 9 & 11; *Salvian.* p. 142, tab. 48; *Bellon. Aquat.* i. p. 93; *Gesner, Aquat.* iv. p. 988; *Rondel.* lib. xii. c. 19, pp. 358, 362; *Willughby*, p. 81, tab. D 4.
Raja, sp., *Artedi, Synon.* p. 102. no. 10.
Narcacion, sp., *Klein, Pisc. Miss.* iii. p. 31. nos. 1 & 2.
Tremuelga, *Cornide*, p. 123.
Raja torpedo, *Gm. L. Syst. Nat.* i. p. 1504; *Bloch, Ausl. Fisch.* i. p. 44, tab. 122; *Bl. Schn.* p. 358; *Blumenbach, Abbild.* taf. 57; *Geoffr. St.-Hil. in Ann. Mus.* i. p. 392, tab. 26. fig. 1.
—— narce, *Nardo, Prodr. Ichth. Adr.* no. 4.
Torpedo narke, *Risso, Ichth. Nice*, p. 8, and *Eur. Mérid.* iii. p. 142; *Cuv. Règne An.*; *Bonap. Faun. Ital. Pesc.*
—— unimaculata, *Risso, Ichth. Nice*, p. 19, pl. 3. fig. 3, and *Eur. Mérid.* iii. p. 143, fig. 8.
—— ocellata, *Rudolphi, Grundr. Physiol.* i. p. 199; *Olfers, Torpedo*, p. 9, tab. 1. fig. 3; *Henle, Narcin.* p. 30.

Torpedo oculata, *Davy, Research.* i. p. 78, and in *Philos. Trans.* 1829, p. 15, and 1832, p. 259; *Müll. & Henle,* p. 127; *Duméril, Rev. Zool.* 1852, p. 234, or *Elasmobr.* p. 506.

Spiracles without fringes; their distance from the eye is scarcely more than their own diameter. The first dorsal fin is not twice as large as the second, and only its anterior half is opposite to the base of the ventrals. The longitudinal pit at the angle of the mouth is only half as long as the cleft of the mouth. The band of mandibulary teeth is but little shorter than the distance between the angles of the mouth. Light brown above, with from one to seven large blue ocelli; generally with indistinct rounded whitish spots on the posterior part of the trunk. The ocelli are rarely entirely absent.

Mediterranean and neighbouring parts of the Atlantic.

a–b. Fine specimens. Lisbon. Presented by the Rev. R. T. Lowe.
c. Adult: stuffed. Mediterranean.
d, e–g. Adult, half-grown, and young. Mediterranean.
h. Half-grown. Adriatic.
i, k. Half-grown.

3. **Torpedo marmorata.**

Narce *or* Torpedo, *Bellon. Aquat.* i. p. 90.
Torpedo tertia *et* quarta, *Rondel.* p. 363.
Torpedo, *Walsh, Phil. Trans.* 1773, p. 461, tab. 19; *Hunter, ibid.* p. 481, tab. 20; *Pringle, ibid.* 1774; *Cavendish, ibid.* 1776, p. 196.
Narcacion, *Klein, Pisc. Miss.* iii. p. 32. nos. 3 & 4.
Raja torpedo, *L. Syst. Nat.* i. p. 395; *Brünn. Ichth. Massil.* p. 1; *Donov. Brit. Fish.* iii. pl. 53; *Turton, Brit. Faun.* p. 10.
Electric Ray, *Pennant, Brit. Zool.* iii. p. 78, pl. 10, and, ed. 1812, iii. p. 118, pl. 12.
Torpedo marmorata, *Risso, Ichth. Nice,* p. 20, pl. 3. fig. 4, or *Eur. Mérid.* iii. p. 143, fig. 9; *Olfers, Torped.* p. 14; *Henle, Narcine,* p. 30; *Müll. & Henle,* p. 128; *Duméril, Rev. Zool.* 1852, p. 236, or *Elasmobr.* p. 508; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 542, and 3rd edit. ii. p. 559.
—— galvanii, *Risso, Ichth. Nice,* p. 21, pl. 3. fig. 5, or *Eur. Mérid.* iii. p. 144; *Bonap. Faun. Ital. Pesce.*
Torpille, *Réaumur, Mém. Ac. Sc. Paris,* 1714, p. 344, tab. 12. fig. 1, tab. 13. fig. 2; *Duhamel, Pesches,* ii. p. 286, tab. 13.
Torpedo vulgaris, *Fleming, Brit. An.* p. 169.
—— diversicolor, *Davy, Philos. Trans.* 1834, ii. p. 550.
—— picta, *Lowe, Proc. Zool. Soc.* 1843, p. 93.
—— trepidans, *Val. in Webb & Berthel. Iles Canar. Poiss.* p. 101; *Duméril, Rev. Zool.* 1852, p. 238, or *Elasmobr.* p. 511.
—— hebetans, *Valenc. l. c.* pl. 23 (not *Lowe*).
Narcacion polleni, *Bleek. Ned. Tydschr. Dierk.* iii. p. 171.

Spiracles distinctly fringed; their distance from the eyes is scarcely more than their own diameter. The first dorsal fin is not twice as large as the second, and about its anterior half is opposite to the base of the ventrals. A distinct longitudinal pit at each angle of the mouth. The band of mandibulary teeth is but little shorter than the distance between the angles of the mouth.

Upper parts marbled with brown, brownish or whitish, the one or the other colour being predominant.

Mediterranean; Eastern Atlantic; Indian Ocean.

a, b, c, d, e–f. Adult and half-grown. Madeira. Presented by the Rev. R. T. Lowe and J. Y. Johnson, Esq.
g–i. Half-grown: stuffed. Mediterranean.
k. Half-grown. Nice. From Dr. Deakin's Collection.
l–o. Adult and half-grown. Propontis. From Mr. Millingen's Collection.
p. Half-grown. Port Natal. From Mr. Ayres's Collection.
q, r. Adult.
s. Adult. Presented by Sir A. Smith.

4. Torpedo panthera.

Torpedo panthera, *Ehrenberg*; *Rüpp. N. W. Fisch.* p. 68, taf. 19. fig. 1; *Müll. & Henle,* p. 193.

Spiracles fringed. The first dorsal fin is not twice as large as the second, and appears to be entirely opposed to the ventrals. The band of mandibulary teeth is short, having only half the extent of the maxillary band, and occupying the middle portion of the mandible. Brown, with numerous whitish spots.

Red Sea.

5. Torpedo smithii.

Spiracles distinctly fringed, crescent-shaped, rather narrow, their own diameter being scarcely one-half of their distance from the eyes, which are extremely small. The first dorsal fin is rather small, not twice as large as the second, and its end exactly opposite to the end of the base of the ventrals. The band of mandibulary teeth occupies the entire circumference of the jaw. Each angle of the mouth with a short longitudinal groove. The colour has very much faded; it appears to have been a dark brown with still darker spots.

? South Africa.

a. Fifteen inches long. Presented by Sir A. Smith.

6. Torpedo fuscomaculata.

Peters, Monatsber. Ak. Wiss. Berlin, 1855, p. 466.

Spiracles distinctly fringed; their distance from the eyes is more than their own diameter. The first dorsal fin is not twice as large as the second, and is so much advanced that its origin is opposite to the vent, and its end in front of the end of the base of the ventrals. The band of mandibulary teeth is but little shorter than the distance between the angles of the mouth. Dark brown with or without black spots.

East Africa.

a, b–c. Fine specimens. Zanzibar. Presented by Lieut.-Colonel Playfair.

6. NARCINE *.

Narcine, *Henle.*

This genus differs from *Torpedo* in having the spiracles almost immediately behind the eye. The teeth are almost flat, sometimes with a median point, which, however, does not project. Tail longer than the disk.

Tropical and subtropical seas.

1. Narcine tasmaniensis.

Richards. Proc. Zool. Soc. 1841, p. 22, and *Trans. Zool. Soc.* iii. p. 178, pl. 11. fig. 2.

Outline of the disk elliptical. Spiracle at a short distance behind the eye, without tubercles on the margin. The first dorsal not larger than the second. Hind margin of the caudal obliquely rounded, passing into the lower margin.

Tasmania.

a. Type of the species. Presented by Sir J. Richardson.

2. Narcine timlei.

Raja timlei, *Bl. Schn.* p. 359.
Narcine timlei, *Henle, Narcin.* p. 34, pl. 2. fig. 1; *Müll. & Henle,* p. 130; *Duméril, Rev. Zool.* 1852, p. 273, or *Elasmobr.* p. 519; *Bleek. Nat. Tyds. Ned. Ind.* iv. 1853, p. 512; *Kner, Novara, Fisch.* p. 417.
—— indica, *Henle, Narcin.* p. 35, pl. 2. fig. 2; *Müll. & Henle,* p. 130; *Duméril, ll. cc.*; *Cantor, Mal. Fish.* p. 417.
—— microphthalma, *Duméril, Rev. Zool.* 1852, p. 275.
—— macrura, *Duméril, l. c.* p. 277.
—— maculata, *Duméril, l. c.* p. 274, and *Elasmobr.* p. 518.

Outline of the disk nearly circular. Spiracle immediately behind the eye, without tubercles on the margin. The first dorsal not larger than the second; hinder margin of the caudal confluent with the lower, rounded.

East Indies; Japan.

a. Adult: skin. Pinang. From Dr. Cantor's Collection.
b. Half-grown. From the Collection of the Zoological Society.

3. Narcine lingula.

Richardson, Ichth. Chin. p. 169.

Outline of the disk nearly circular. Spiracle immediately behind the eye, without tubercles on the margin. The first dorsal not larger than the second. Hinder margin of the caudal vertical, truncate, perfectly distinct from the lower margin.

China.

a–b. Male and female. China. Presented by Sir J. Richardson.

---

* 1. Torpedo californica, *Ayres, Proc. Calif. Ac. Nat. Sc.* i. 1855, p. 70; Narcine californica, *Girard, U. S. Pac. R.R. Exped. Fish.* p. 371.—San Francisco.

4. Narcine brasiliensis.

Raja, sp., *Gronov. Zoophyl.* no. 358, tab. 9. fig. 3.
? Torpedo ocellata, *Quoy & Gaim. Voy. Uran. Poiss.* p. 199.
Torpedo brasiliensis, *Olfers, Torped.* p. 19, tab. 2. fig. 4.
—— bancroftii, *Griffith, An. Kingd.* x. (1834) p. 649, pl. 34.
Narcine brasiliensis, *Henle, Narcin.* p. 31, tab. 1. figs. 1 & 2; *Müll. & Henle,* p. 129; *Duméril, Rev. Zool.* 1852, p. 272, and *Elasmobr.* p. 514; *Kner, Novara, Fisch.* p. 418.
—— nigra, *Duméril, ll. cc.*
Torpedo pictus, *Gronov. Syst.* ed. *Gray,* p. 13.

Outline of the disk elliptical. Spiracle immediately behind the eye, surrounded by a ring of small tubercles. The first dorsal not larger than the second; hinder margin of the caudal subtruncate.

Atlantic coasts of Tropical America, entering fresh-waters; Cape of Good Hope.

a–b. Adult (21 inches long): stuffed.
c. Young. Pará.
d. Young. Caribbean Sea. From the Collection of the Zoological Society.
e–f. Adult. Cuba. From the Collection of the Zoological Society.
g–i. Adult and half-grown: skins. Jamaica. Purchased of Mr. Parnell.

7. HYPNOS.

Hypnos, *Duméril, Rev. Zool.* 1852, p. 277.

Tail extremely small and short, like an appendage. Body entirely naked. Two dorsal fins on the tail, without spine; caudal well developed. Nostrils round, open, without valves. Teeth tricuspid, with very slender points. Spiracles immediately behind the eyes. An electric apparatus on each side of the head.

Australian seas.

1. Hypnos subnigrum.

Duméril, l. c. p. 279, pl. 12, and *Elasmobr.* p. 520.

Eyes minute; spiracles fringed. Upper parts black, with or without white spots.

Australian seas.

a–b. West Australia. Purchased of Mr. Bowerbank.

8. DISCOPYGE.

Discopyge, *Tschudi, Faun. Peruan. Pisc.* p. 32.

Tail very distinct from the circular disk, with a fold on each side. Body entirely naked. Two dorsal fins on the tail, without spine; caudal well developed; ventral fins united. Nasal valves confluent into a quadrangular valve. Teeth flat, with the hinder edge angularly produced. Spiracles at a very short distance behind the eyes. An electric apparatus between the head and pectoral fins.

Coast of Peru.

1. Discopyge tschudii.

Tschudi, l. c. p. 33, taf. 6.

Spiracles without fringes. Vent in the middle of the total length. Hinder and lower margins of the caudal fin confluent.

Peru.

9. ASTRAPE.

Astrape, *Müll. & Henle.*

Tail with a fold on each side. Body entirely naked. One dorsal fin only, on the tail, without spine; caudal well developed. Anterior nasal valves confluent into a broad flap, overhanging the mouth. Teeth pointed; dental laminæ scarcely extending beyond the outer margin of the jaws. Spiracles immediately behind the eyes, which are minute. An electric apparatus between the head and pectoral fin.

Indian seas; South Africa.

1. Astrape capensis.

Raja, sp., *Gronov. Zoophyl.* no. 152.
Raja capensis, *Gm. L.* i. p. 1512; *Bl. Schn.* p. 360.
Torpedo capensis, *Olfers, Torped.* p. 23; *Gronov. Syst.* ed. *Gray*, p. 13.
Narcine capensis, *Henle, Narcin.* p. 36, pl. 3. fig. 1.
Astrape capensis, *Müll. & Henle*, p. 130; *Duméril, Rev. Zool.* 1852, p. 280, and *Elasmobr.* p. 522; *Kner, Novara, Fisch.* p. 419.

Spiracles not fringed. Vent nearer to the extremity of the tail than to the front margin of the disk.

Cape of Good Hope; Madagascar.

a. Adult. Presented by Sir A. Smith.
b. Skin. From Gronow's Collection.
c. Half-grown. Madagascar.

2. Astrape dipterygia.

Raja dipterygia, *Bl. Schn.* p. 359.
Torpedo dipterygia, *Olfers, Torped.* p. 25, tab. 2. fig. 2.
Narcine dipterygia, *Henle, Narcin.* p. 38.
Astrape dipterygia, *Müll. & Henle*, p. 131; *Cant. Mal. Fish.* p. 419; *Duméril, Rev. Zool.* 1852, p. 281, and *Elasmobr.* p. 523; *Day, Fish. Malab.* p. 276.
—— japonica, *Schleg. Faun. Japon. Poiss.* p. 307, pl. 140.

Spiracles not fringed. Vent nearly in the middle of the entire length of the fish.

Indian seas; China and Japan.

a–b. Adult. Pinang. From Dr. Cantor's Collection.
c. Adult: skin. Pinang. From Dr. Cantor's Collection.
d. Half-grown. Canton. From the Collection of the Zoological Society.

10. TEMERA.

Temera, *Gray, Zool. Misc.* p. 7.

Distinguished from *Astrape* by the entire absence of dorsal fins. The teeth are obtuse.

East Indies.

1. Temera hardwickii.

Gray, l. c., and *Ill. Ind. Zool.* c. fig.; *Müll. & Henle*, p. 131, taf. 59. fig. 2; *Cant. Mal. Fish.* p. 420, pl. 12; *Bleek. Nat. Tyds. Ned. Ind.* xx. p. 451.

Coloration uniform, or with blackish markings or whitish spots.

East Indies.

a–b. Types of the species. Pinang. Presented by General Hardwicke.

Fam. 4. RAJIDÆ.

Disk broad, rhombic, generally with asperities or spines; tail with a longitudinal fold on each side. The pectorals extend to the snout. No electric organ. No serrated caudal spine.

11. RAJA[*].

Raja, sp., *Artedi.*
Raja, *Cuv. Règne Anim.*
Raja *et* Uraptera, *Müll. & Henle.*

Tail very distinct from the disk, which is of rhombic shape, with a fold on each side. Body generally rough or with spines, rarely entirely smooth. Two dorsal fins on the tail, without spine. Tail with a rudimentary caudal fin, or without caudal. Each ventral fin divided into two by a deep notch. Nasal valves separated in the middle, where they are without a free margin. Teeth obtuse or pointed. Pectoral fins not extending forward to the extremity of the snout. Sexes differing in the form of the teeth and in the dermal spines.

---

[*] 1. Raja brasiliensis, *M. & H.* p. 195.—Brazil.
2. —— capensis, *M. & H.* p. 151; *Duméril, Elasmobr.* p. 540; *Kner, Novara, Fisch.* p. 419; ? *Capello, Jorn. Acad. Sc. Lisb.* 1869, p. 151.—Cape of Good Hope.
3. —— jojenia, *Cocco, Att. Ac. Gioen. Catan.* xi. pp. 85–88, c. tab.; *Duméril, l. c.* p. 544.—Mediterranean.
4. —— oxyrhynchus, *Bl.* taf. 80; *M. & H.* p. 148; *Duméril, l. c.* p. 546.—Mediterranean; Atlantic (?).
5. —— ocellata, *Mitch. Lit. & Phil. Trans. N. York*, i. p. 477; *Dekay, N. York Faun. Fish.* p. 369, pl. 65. fig. 212; *Duméril, Elasmobr.* p. 539; Raja chantenay, *Lesueur, Journ. Ac. Nat. Sc. Phil.* 1824, iv. p. 106, pl. 5.—North America.
6. —— desmarestia, *Lesueur, l. c.* p. 100, pl. 4; *Dekay, l. c.* p. 372; *Duméril, l. c.* p. 551; Raja americana, *Dekay, l. c.* p. 368, pl. 66. fig. 215.—North America.
7. —— lima, *Poeppig, Reise in Chile*, i. p. 148; Raja chilensis, *Gay, Chile*, ii. p. 367; *Duméril, l. c.* p. 553.—Chile.
8. —— meerdervoortii, *Bleek. Act. Soc. Sc. Indo-Neerl.* viii. *Japan*, vi. p. 66.—Japan.
9. —— chinensis, *Basil. Nouv. Mém. Soc. Nat. Mosc.* 1855, p. 251.—China.
10. —— cooperi, *Girard, U. S. Pac. R.R. Exp. Fish.* p. 372.—Shoal water.
11. —— scobina, *Philippi, Wiegm. Arch.* 1857, p. 270; Uraptera scobina, *Duméril, Elasmobr.* p. 574.—Chile.
12. —— lævis, *Mitch. Amer. Monthl. Mag.* 1818, p. 327; *Dekay, New York*

Seas of both hemispheres, more numerous in the northern than in the southern.

α. Short-snouted species.

1. Raja clavata.

Thorn-back.

Raja, *Bellon. De Aquat.* p. 79; *Rondel.* pp. 353, 354; *Gesner. Aquat.* pp. 795, 797; *Aldrov.* p. 460; *Willughby*, pp. 74, 78, tab. D 2. figs. 2 & 3; *Salvian.* p. 149; *Artedi. Synon.* p. 99. no. 2; *Gen.* p. 71. no. 2; *Spec.* p. 103. no. 1; *Gronov. Mus. Ichth.* i. p. 140, and *Zoophyl.* no. 154.

Raja clavata, *L. Syst. Nat.* i. p. 397; *Bl.* taf. 83; *Lacép.* i. p. 128; *Bl. Schn.* p. 366; *Risso, Ichth. Nice*, p. 11, and *Eur. Mérid.* iii. p. 146; *Montagu. in Werner. Mem.* ii. p. 416; *Fries, in Vet. Akad. Handl.* 1839, p. 15, pl. 2. fig. 1. pl. 3. figs. 1–3, 7; *Jenyns, Man.* p. 516; *Fries & Ekstr. Skand. Fisk.* p. 154. tab. 35; *Müll. & Henle*, p. 135; *Yarrell. Brit. Fish.* 2nd edit. ii. p. 582, or 3rd edit. ii. p. 581; *Parnell, Werner. Mem.* vii. p. 436, tab. 42; *Donov. Brit. Fish.* ii. pl. 26; *Gronov. Syst.* ed. *Gray*, p. 9; *Kröy. Danm. Fisk.* iii. p. 962; *Kessler. Bull. Soc. Nat. Mosc.* 1859. ii. p. 475; *Nilss. Skand. Faun. Fisk.* p. 735; *Duméril, Elasmobr.* p. 528.

—— rubus, *Bl.* taf. 84. iii. p. 67; *Bl. Schn.* p. 366; *Lacép.* i. p. 107.

—— cuvieria, *Lacép.* i. p. 141. pl. 7. fig. 1; *Bl. Schn.* p. 367; *Neill, Werner. Mem.* i. p. 554; *Flem. Brit. An.* p. 172.

—— aspera. *Risso. Ichth. Nice*, p. 5. and *Eur. Mérid.* iii. p. 147.

Thorn-back, *Penn. Brit. Zool.* iii. p. 82. pls. 11 & 12, and, ed. 1812, iii. p. 122, pls. 13 & 14.

Duhamel. Pesches. iii. sect. ix. pl. 8. figs. 1–4, pl. 9. figs. 1 & 2.

Dasybatis clavata. *Blainv. Faun. Fr.* p. 33. tab. 5 c. fig. 2; *Bonap. Faun. Ital.*

—— rubus, *Blainv. l. c.* p. 21, tab. 3 c. fig. 1.

Raja punctata, *Hollberg, Göth. Vet. N. Handl.* iv. p. 25 (young).

—— pontica. *Pallas. Zoogr. Ross.-As.* iii. p. 58, pl. 8; *Rathke, in Mém. Sav. étrang. Ac. Sc. Pétersb.* 1837, iii. p. 309. pls. 9 & 10.

Monstrosity: *Gervais, Compt. Rend.* 1864, ii. p. 802.

Angle of the extremity of the snout obtuse. The distance between the outer margins of the nostrils equals their distance from the end of the snout. Teeth rather large. Outer pectoral angle nearly a right one. Body more or less covered with small spiny asperities, especially the snout and interorbital space. Supraorbital ridge with a claw-like spine in front, and another behind. Back and tail with a median row of large spines. Brown, with lighter

---

Faun. Fish. p. 370; *Storer, Mem. Amer. Acad.* ix. 1867, p. 242. pl. 39. fig. 2; Raja batis, *Storer, Report.* p. 193.—Coasts of the United States.

13. Raja mosaica, *Capello, Jorn. Acad. Sc. Lisb.* 1869, p. 150, tab. 9. fig. 3 not synon.) (R. undulata. p. 228).—Lisbon.

spots. *Male*: Only the middle teeth are conically pointed; snout covered with small asperities above and below; some portions of the trunk with similar asperities, others naked. A patch of claw-like spines on the side of the head, and another on the pectoral fin. Trunk without other large spines, and only a few on the side of the tail. *Female*: All the teeth are flat. Nearly all the upper parts of the body covered with small asperities; body above and below with more or less numerous very large round osseous bucklers, each with a spine in the centre; tail armed with rows of similar spiny bucklers, the median row always being distinct.

Coasts of Europe.

a. Adult male: stuffed. Sweden. Presented by Hr. A. W. Malm.
b. Young female. German Ocean.
c–e. Young: skins. Holland. From Gronow's Collection.
f–g. Adult males: skins. Firth of Forth. Purchased of Mr. Parnell.—Trunk without bucklers.
h–i. Adult males: stuffed. Firth of Forth. Purchased of Mr. Parnell.—A single buckler on each side of the shoulder.
k. Half-grown female: stuffed. Firth of Forth. Purchased of Mr. Parnell.—Snout and tail with bucklers; none on the trunk.
l. Adult female: stuffed. English coast.—Trunk and tail with numerous osseous bucklers.
m. Half-grown female: stuffed. English coast.—Trunk with a few, tail with numerous bucklers.
n–q. Young: stuffed. English coast.
r. Adult male: skin. South Devon. From Mr. Yarrell's Collection.
s–w. Adult, half-grown, and young females: skins. South Devon.
x. Half-grown male: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.—Anterior part of the pectoral fin abnormally not attached to the head.
y–α. Young: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.
β–γ. Half-grown and young: skins. Plymouth. Purchased of Mr. Yarrell.
δ. Young. Devonshire. Presented by G. Montagu, Esq.
ε. Half-grown female: stuffed. Adriatic. Purchased of Dr. Heckel.—Osseous bucklers few in number, but very large, larger than the eye.
ζ–η, θ–κ. Adult and half-grown females. Golden Horn. From Mr. Millingen's Collection.
λ–μ. Adult and young females: stuffed. Madeira. Presented by the Rev. R. T. Lowe.—Only one small osseous buckler on each side of the shoulder; so that this female does not differ from males of more northern seas.
ν. Young. Mauritius (??).
ξ. Adult male: stuffed.
ο–π. Adult: skeletons. From the Collection of Dr. van Lidth de Jeude.
ρ. Jaws of several examples.

2. Raja maculata.

The Homelyn Ray.
Fuller Ray, *Penn. Brit. Zool.* iii. p. 86, or, edit. 1812, iii. p. 116.
Raja maculata, *Montagu, Werner. Mem.* ii. p. 426; *Jenyns, Man.* p. 514; *Parnell, Werner. Mem.* vii. p. 434, tab. 42; *Thompson, Nat. Hist. Irel.* iii. p. 260.
—— rubus, *Donov. Brit. Fish.* i. pl. 20; *Turt. Brit. Faun.* p. 111.
—— miraletus, *Donov. Brit. Fish.* v. pl. 103; *Turt. Brit. Faun.* p. 111; *Jenyns, Man.* p. 518; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 570, or 3rd edit. ii. p. 570.
—— microcellata, *Montagu, Werner. Mem.* ii. p. 430; *Flem. Brit. An.* p. 171; *Jenyns, Man.* p. 515; *M'Coy, Ann. Nat. Hist.* vi. p. 407; *Yarrell, Brit. Fish.* 2nd & 3rd edit. ii. p. 567.
Spotted Ray, *Couch, Fish. Brit. Isl.* i. p. 104, pl. 24.
Painted Ray, *Couch, l. c.* p. 107, pl. 25.

The margins of the snout form an obtuse angle; but its extremity is slightly produced and projecting. The width of the interorbital space is equal to that of the orbit together with the spiracle. The distance between the outer margins of the nostrils is a little less than their distance from the end of the snout. Teeth rather small, about fifty or sixty series can be distinguished in the upper jaw. Outer pectoral angle nearly a right one. *Body nearly smooth*; a series of compressed spines along the middle of the back and tail; sometimes another series along the side of the tail. Supraorbital ridge with one or more claw-like spines in front, and with some others behind. Only a few very small asperities along the ridges of the snout. *Male* with a patch of claw-like spines on the side of the head, and another on a level with the outer angle of the pectoral fin. *Upper parts with numerous dark brown or black spots.*

Coasts of Europe.

a. Adult male: stuffed. Firth of Forth.
b. Half-grown female: stuffed. Firth of Forth.
c. Many half-grown and young specimens: skins. English coast.
d. Young. Falmouth. Presented by W. C. Cocks, Esq.
e–f. Adult females. Guernsey. Presented by Capt. Harcourt Powell.
g–h. Half-grown: skins. English coast. From Mr. Yarrell's Collection, as *R. microcellata*.
i. Half-grown female: skin. Madeira. Presented by the Rev. R. T. Lowe.
k–l. Jaws. From Yarrell's Collection.

3. Raja punctata.

Raja punctata, *Risso, Ichth. Nice*, p. 12, and *Eur. Mérid.* iii. p. 153.
Dasybatis asterias, *Bonap. Faun. Ital. Pesc.*
Raja Schultzii, *Müll. & Henle*, pp. 138, 194, taf. 46. fig. 1; *Duméril, Elasmobr.* p. 541.

Angle formed by the margins of the snout obtuse, the extremity slightly projecting. The width of the interorbital space (which is flat and very rough) is equal to the length of the orbit together with the spiracle. *Teeth obtuse, in from 40 to 45 series in the upper jaw.*

The outer pectoral angle is rounded; the margins would meet at a right angle. Spines along the superciliary margin, and the median line of the back and tail. *Male* nearly smooth, with asperities on each side of the head and on the interorbital space. A subtriangular space of spines on the middle of the back. *Female* entirely covered with small spines. *Coloration*: Body with numerous brown dots, and one or several yellow ocelli, each of which has a brown pupil, and is surrounded by a ring of brown dots.

Southern Europe.

a–b. Young males. Purchased.
c. Young female. Purchased of Hr. Frank.

4. **Raja maderensis.**

Lowe, Trans. Zool. Soc. 1841, ii. p. 195, and *Proc. Zool. Soc.* 1843, p. 94; *Valenc. in Webb. & Berthel. Iles Canar. Poiss.* p. 100, pl. 25; *Duméril, Elasmobr.* p. 545.

The angle made by the margins of the snout is rather obtuse. The width of the interorbital space is equal to the length of the orbit. The distance between the outer margins of the nostrils is somewhat more than their distance from the end of the snout. Teeth pointed in the male, in about 44 series in the upper jaw. The outer pectoral angle is a right one. *Body entirely covered with minute asperities.* Scarcely any larger spines on the trunk (except the patch of pectoral spines in the male). Tail with a single series of spines along the median line; superciliary ridge with a few spines in front and behind. *Brown, with numerous round yellowish spots.*

Madeira; Canary Islands.

a. Adult male. Madeira. Presented by J. Y. Johnson, Esq.

5. **Raja undulata.**

Raja undulata, *Lacép.* iv. p. 675, pl. 14. fig. 2; *Müll. & Henle*, p. 134; *Duméril, Elasmobr.* p. 537.
—— mosaica, *Lacép.* iv. p. 675, pl. 16. fig. 2; *Risso, Eur. Mérid.* iii. p. 154.
—— alba, *Lacép.* v. p. 663, pl. 20. fig. 1.

Anterior profile of the snout very obtuse, rounded, with the extremity very slightly projecting beyond it. The width of the interorbital space is equal to the length of the orbit together with the spiracle. The distance between the outer margins of the nostrils is somewhat less than their distance from the end of the snout. Teeth small, obtuse, in about 60 series in the upper jaw. *Outer pectoral angle rounded. Body smooth*; a series of spines along the median line of the back and tail; a series of smaller spines along the side of the tail; superciliary edge with a spine in front and behind; a spine on each side of the shoulder. Brownish, with or without transverse undulated bands, and with or without round spots of a light colour.

Mediterranean and neighbouring parts of the Atlantic.

a. Young male. Madeira. Presented by the Rev. R. T. Lowe.

6. Raja radiata.

Raja fullonica, *Fabr. Faun. Grœnl.* p. 125; *Faber, Fisch. Isl.* p. 38.
—— clavata, *Hollb. Götheb. Vet. N. Handl.* iv. p. 29.
—— radiata, *Donov. Brit. Fish.* v. pl. 114; *Flem. Brit. An.* p. 170; *Yarr. Brit. Fish.* 2nd edit. ii. p. 585, or 3rd edit. ii. p. 587; *Parnell, Trans. R. Soc. Edinb.* 1840, p. 145, and *Werner. Mem.* vii. p. 439, pl. 43; *Jenyns, Brit. Vert.* p. 517; *Fries, Vet. Ak. Handl.* 1839, p. 146, pl. 3. fig. 4; *Nilss. Skand. Faun. Fisk.* p. 736; *Wright & Ekstr. Skand. Fisk.* p. 100, pl. 43; *M'Coy, Ann. & Mag. Nat. Hist.* 1841, vi. p. 405; *Müll. & Henle*, p. 137; *Kröyer, Danm. Fisk.* iii. p. 938; *Couch, Fish. Brit. Isl.* i. p. 103, pl. 23 (cop. *Donovan*); *Duméril, Elasmobr.* p. 531.

Angle of the extremity of the snout obtuse. The width of the interorbital space is equal to the length of the orbit. Teeth in about 45 series in the upper jaw, pointed in the male. Outer pectoral angle rounded. *Body and tail with large bucklers, each with a radiate or stellate base.* One series of large and rather distant bucklers along the median line of the back and tail, accompanied on each side by another row of smaller bucklers. A pair of bucklers on each side of the shoulder. Also the small dermal ossifications have a radiated base. *Male* with a band of claw-like spines opposite to the outer angle of the pectoral fin.

Northern coasts of Europe.

a–c. Adult males and female: skins. Firth of Forth.
d–e. Adult males and young: skins. From Mr. Yarrell's Collection.

7. Raja asterias.

Müll. & Henle, pp. 139 & 194, pl. 46. fig. 2 (not synon.); *Duméril, Elasmobr.* p. 543 (not synon.).

Anterior profile of the snout obtusely rounded, with the extremity slightly projecting. The width of the interorbital space is rather more than the length of the orbit. The distance between the outer margins of the nostrils is a little more than their distance from the end of the snout. *Teeth small, in about 80 series in the upper jaw*, obtuse in the female. Outer pectoral angle nearly a right one. *Body entirely covered with minute asperities.* A series of spines along the median line of the back and tail; another series along each side of the tail. Very small spines in front and behind the superciliary ridge. *Upper parts with numerous round dark-brown spots*, sometimes mixed with larger ones of a bright colour.

Coasts of Southern Europe; Madeira.

a, b. Adult females. Madeira. Presented by J. Y. Johnson, Esq.

8. Raja miraletus.

Raja miraletus, *L. Syst. Nat.* i. p. 396; *Brünn. Ichth. Mass.* p. 2; *Lacép.* i. p. 75; *Risso, Ichth. Nice*, p. 4, and *Eur. Mérid.* iii. p. 149; *Bonap. Faun. Ital. Pesce*; *Müll. & Henle*, p. 141; *Duméril, Elasmobr.* p. 548.

Raja oculata, *Risso, Eur. Mérid.* iii. p. 149.
—— biocularis, *Geoffr. St.-Hil. Descr. Eg. Poiss.* pl. 27. fig. 2.
? Raja quadrimaculata, *Bonap. Faun. Ital. Pesce.*

The margins of the snout form an obtuse angle, but the extremity is pointed and forms a distinct projection. *The width of the interorbital space is less than the length of the orbit.* The distance between the outer margins of the nostrils is rather less than their distance from the end of the snout. Teeth in about 40 series in the upper jaw, obtuse. The outer pectoral angle is a right one. Body smooth; a series of spines along the middle of the back, and three series on the tail. One or two spines in front and behind the orbit. *A large blue black- and white-edged ocellus on each side of the back.*

Coasts of Southern Europe.

a. Young male. Purchased.

9. Raja atra.

Müll. & Henle, p. 134, tab. 45; *Duméril, Elasmobr.* p. 535.

Snout very short and obtuse; outer angle of the pectorals rounded. Body smooth in the young, covered with minute asperities in older examples (according to the figure quoted); superciliary margin with a spine in front and behind; a series of spines along the median line of the back and tail. *Uniform blackish.*

Mediterranean.

10. Raja radula.

Raja radula, *De la Roche, Ann. Mus.* 1809, xiii. p. 321; *Risso, Eur. Mérid.* iii. p. 151; *Müll. & Henle,* p. 133; *Duméril, Elasmobr.* p. 534.
—— virgata, *Geoffr. St.-Hil. Descript. Eg. Poiss.* p. 223, pl. 26. figs. 2 & 3.
Dasybatis radula, *Bonap. Faun. Ital. Pesce.*

Snout very short and obtuse, subtruncate in front. Body covered with minute asperities; a series of spines along the median line of the back and tail; several other irregular series of spines on the tail. Teeth obtuse. Yellowish brown, marbled with darker and with lighter spots. *A black ocellus on each side of the back.*

Mediterranean.

a. Malta. From the Haslar Collection.

11. Raja kenojei.

Müll. & Henle, p. 149, pl. 47 (not good); *Richards. Ichth. Chin.* p. 197; *Schleg. Faun. Japon. Poiss.* p. 308; *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Japan,* iv. p. 42 (part.), and viii. *Japan,* vi. p. 65; *Duméril, Elasmobr.* p. 556.

Angle of the extremity of the snout rather obtuse; the width of the interorbital space is equal to the length of the orbit with the spiracle. Teeth in about 42 series in the upper jaw, obtuse in the female. Outer pectoral angle rounded. *Body naked*: a row of spines along the superciliary margin; two spines in the median line of the back; tail with five series of rather small spines.

Japan.

a. Female. Japan. Purchased of Mr. Jamrach.

12. Raja eglanteria.

Raja eglanteria, *Lacép.* ii. pp. 103, 109, tab. 4. fig. 2; *Lesueur, Journ. Ac. Nat. Sc. Philad.* iv. p. 103, pl. 6; *Storer, Mem. Am. Acad.* ii. p. 512; *Duméril, Elasmobr.* p. 532.
—— diaphanus, *Mitch. Lit. & Phil. Trans. New York*, i. p. 478; *Dekay, New York Faun. Fish.* p. 366, pl. 67. fig. 218; *Storer, l. c.* p. 510, and ix. 1867, p. 240, pl. 39. fig. 1.
—— erinaceus, *Mitch. in Sillim. Journ.* 1825, ix. p. 290, pl. 6 (cop. by *Dekay, l. c.* p. 372, pl. 78. fig. 246); *Storer, l. c.* p. 511.

Angle of the extremity of the snout obtuse. The width of the interorbital space is equal to the length of the orbit with the spiracle. Teeth in about 50 series in the upper jaw, obtuse in the female. Outer pectoral angle rounded. Body partly naked; parts of the body and the tail with numerous rather small spines, each with a radiated base. *The median line of the back and tail is naked, but there are on each side of it three series of spines; a triangular space in the middle of the back covered with similar spines.* A row of spines along the superciliary margin; eyelid naked. Body with brown spots.

Atlantic coasts of North America.

a. Female. New York.

13. Raja circularis.

Sandy Ray.
Raja circularis, *Couch, in Charlesw. Mag. Nat. Hist.* 1838, ii. p. 71, and in *Cornish Faun.* p. 53, and in *Fish. Brit. Isl.* i. p. 115, pl. 28; *Van Bened. Bull. Acad. Sc. Belg.* 1865, xx. p. 48.
—— spinosa, *Yarr. Brit. Fish.* 2nd edit. ii. p. 574.
—— falsavela, *Bonap. Faun. Ital. Pesce* (*also the figure on the same plate with* falsavela, *named* R. quadrimaculata); *Duméril, Elasmobr.* p. 550.
—— nævus, *Müll. & Henle*, pp. 138, 194; *Duméril, Elasmobr.* p. 549.
Raja, sp., *M'Coy, Ann. & Mag. Nat. Hist.* 1841, vi. p. 495.
—— radula, *Thomps. Nat. Hist. Irel.* iv. p. 262; *Yarr. Brit. Fish.* 3rd edit. ii. p. 574.
—— miraletus, *Couch, Fish. Brit. Isl.* i. p. 112, pl. 27.

Closely allied to *R. eglanteria*.

Angle formed by the margins of the snout obtuse, the extremity slightly projecting. The width of the interorbital space equal to the length of the orbit. Teeth pointed, in from 70 to 80 series in the upper jaw. Outer pectoral angle obtusely rounded. Upper part of the body covered with minute asperities. A series of spines all along the superciliary ridge; *a triangular space in the middle of the back covered with similar spines; median line of the back and tail without spines or with a few only; several series of spines on each side of the median line of the body and tail.* Generally a round black spot, marbled with yellowish, on each side of the body. Old examples without this ocellated spot, or with a few scattered small round white spots.

Adult male with the additional patches of spines usual in this genus.

Coasts of Europe.

a. Adult female, 4 feet long: stuffed. Ireland. Presented by the Earl of Enniskillen.
b. Half-grown female: skin. South Devon.
c–d. Half-grown females: skins. Plymouth. Presented by Lieut. H. F. Spence, R.N.
e. Adult male: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.
f. Half-grown female: skin. Madeira. Presented by the Rev. R. T. Lowe.
g–i. Adult male, and half-grown females: skins. From Mr. Yarrell's Collection.
k. Half-grown female: skeleton. Polperro.
l–o. Jaws of adult examples.

14. Raja lemprieri.

Richards. Voy. Ereb. & Terr. Fish. p. 34, pl. 23.

The angle at which the margins of the snout would meet is obtuse; but the extremity is slightly projecting and somewhat pointed. The width of the interorbital space equals the diameter of the eye. Teeth with a point. Outer pectoral angle obtusely rounded. The width of the disk equals the distance of the snout from the posterior end of the root of the ventrals. A series of spines along the superciliary edge; seven or eight occupy the mesial line between the head and humeral cartilage; and a row, beginning at the pelvis, runs down the middle of the tail, having an alternate direction to right and left. There are also some scattered larger spines on the sides of the tail among the smaller ones, but no continuous lateral rows. Tip of the snout black. (*Richards.*)

Van Diemen's Land.

β. Long-snouted species.

15. Raja batis.

The Common Skate.
Raja, sp. no. 9, *Artedi, Gen.* p. 73, and *Synon.* p. 102.
Raja batis, *L. Syst. Nat.* i. p. 395; *Bl.* taf. 79; *Bl. Schn.* p. 369; *Risso, Ichth. Nice*, p. 3; *Hollberg, Göt. Vet. N. Handl.* 1822, p. 21; *Faber, Fisch. Isl.* p. 33; *Turt. Brit. Faun.* p. 110; *Flem. Brit. An.* p. 171; *Jenyns, Man.* p. 510; *Nilss. Skand. Faun. Fisk.* p. 738; *Fries, Vet. Ak. Handl.* 1838, p. 158, pl. 3. fig. 6; *Müll. & Henle*, p. 146; *Yarrell, Brit. Fish.* 2nd & 3rd ed. ii. p. 561; *Kröyer, Danm. Fisk.* iii. p. 978; *Malm, Œfvers. Vet. Ak. Förh.* 1857, p. 193.
Skate, *Penn. Brit. Zool.* iii. p. 72, pl. 9, and, ed. 1812, iii. p. 111, pl. 11.
Duhamel, Pesches, iii. sect. ix. p. 284. pl. 11. figs. 1–4.

Raja leiobatos, *Gronov. Syst.* ed. *Gray*, p. 10.
—— intermedia, *Parnell, Proc. R. Soc. Edinb.* 1837, p. 166; *Trans. R. Soc. Edinb.* 1839, xiv. p. 429, pl. 6; *Werner. Mem.* vii. p. 429, pl. 40; *Yarrell, Brit. Fish.* 2nd or 3rd edit. ii. p. 558; *M'Coy, Ann. & Mag. Nat. Hist.* 1841, vi. p. 406 (not *Couch*).
Læviraja macrorhynchus, *Couch, Fish. Brit. Isl.* i. p. 561.
Development: *Wyman, Mem. Amer. Ac.* 1864, ix. p. 31, or *Ann. & Mag. Nat. Hist.* 1864, xiv. p. 399.

Snout long, produced, pointed, the width of the interorbital space being one-third or, in very old examples, more than one-third of the distance of the eye from the end of the snout. *The anterior profile* (from the snout to the angle of the pectoral fin) *is deeply emarginate, not or but slightly undulated. Mouth transverse, nearly straight.* Teeth somewhat pointed, in about 52 or 56 series in the upper jaw. Outer pectoral angle produced and rather pointed. Body rough in adult female examples, but nearly smooth or with patches of minute asperities, more numerous on the upper and lower sides of the snout than in any other region; males nearly smooth. *Body without larger spines,* except one in front and behind the eye in young examples; one or three series of large spines on the tail. Disk much broader than long. Upper surface of the body dark olive-green, uniform or with numerous large white spots; under surface dark grey, with minute specks of a deeper colour.

Coasts of Europe.

a. Adult female, 5½ feet broad and 6½ feet long: stuffed. German Ocean. Purchased.
b. Adult male. English coast. Purchased on May 11th, which is evidently the breeding-season.
c–f. Half-grown and young: stuffed and skins. Firth of Forth. Purchased of Mr. Parnell.
g–m. Half-grown and young: stuffed and skins. English coasts.
n–o. Half-grown: skins. Plymouth.
p. Young: skin. Holland. From Gronow's Collection.
q–r. Young. Purchased.
s–t. Jaws of adult examples.

Var. *intermedia.* This form has the snout rather more produced than typical *R. batis.* The absence of the lateral series of spines on the tail is not a distinctive character, as that series is frequently absent in *R. batis,* whilst, on the other hand, examples of *R. intermedia* show some spines on the side of the tail. It is not improbable that these specimens are *hybrids* between *R. batis* and some other of the long-snouted species.

a–b. Types of *R. intermedia.* Firth of Forth. Purchased of Mr. Parnell.

Raja (*Uraptera*) *binoculata*, Girard, Proc. Ac. Nat. Sc. Philad. 1854, p. 196, and U. S. & Pac. R.R. Exped. Fish. p. 373; Duméril, Elasmobr. p. 574, from California, may be regarded as a climatic variety of *R. batis.* It differs from the European form in having a single spine on the middle of the shoulder; and young examples have a round obscure spot on each pectoral fin.

a–c. Young. San Francisco. Presented by Dr. W. O. Ayres.
d. Young: skin. Esquimalt Harbour, Vancouver Island. Collected by Mr. Lord.

16. **Raja agassizii.**

Uraptera agassizii, *Müll. & Henle*, p. 155, tab. 49; *Casteln. An. Am. Sud, Poiss.* p. 100, pl. 49. fig. 2; *Duméril, Elasmobr.* p. 573.

Snout long, produced, pointed, the width of the interorbital space being two-sevenths or one-third of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral fin) is undulated. *Mouth strongly curved.* Teeth pointed, in about 48 series in the upper jaw. Palatal velum four-lobed. Outer pectoral angle a right one, but rounded. The distance between the two dorsal fins is twice the length of the base of the first; terminal caudal fin reduced to a fold of the skin *. Body sometimes smooth, sometimes with a few thorns on the orbital margin and shoulder. Tail with a single series of spines. Disk rather broader than long. Coloration uniform, sometimes a dark spot on each side of the back; lower side white.

Brazil.

a. Female. From Prof. Kölliker's Collection.

17. **Raja marginata.**

Raja marginata, *Lacép.* v. p. 663, pl. 20. fig. 2; *Risso, Eur. Mérid.* iii. p. 148; *Blainv. Faun. Fr.* p. 19, pl. 3. fig. 2; *Flem. Brit. An.* p. 172; *Bonap. Faun. Ital. Pesc.*; *Jenyns, Man.* p. 512; *Müll. & Henle*, p. 140; *Yarrell, Brit. Fish.* 2nd & 3rd edit. ii. p. 564; *Couch, Fish. Brit. Isl.* i. p. 110, pl. 26; *Duméril, Elasmobr.* p. 568.
—— rostrata, *Lacép.* iv. p. 672.
—— rostellata, *Risso, Ichth. Nice*, p. 8, pls. 1 & 2, and *Eur. Mérid.* iii. p. 148.
—— oxyrhynchus (Burton Skate), *Couch, l. c.* p. 97, pl. 21 (adult male) (not synon.).

The anterior part of the snout is abruptly contracted into a narrow, thin appendage; the width of the interorbital space is one-third or one-fourth of the distance of the eye from the end of the snout. *The anterior profile* (from the snout to the angle of the pectoral fin) *is deeply undulated.* Teeth with a pointed keel, in about 46 series in the upper jaw. The outer pectoral angle is a right one. *Body smooth above*; a conical spine in front and behind the eye; no spines on the back; lower part of the snout covered with minute asperities. *Tail with three series of spines.* The width of the disk is much more than the distance from the end of the snout to the hind margin of the ventral fin. Pectoral fins generally with a blackish margin.

Coasts of Europe.

---

* Of course this cannot be used as a generic character; in many specimens of typical *Raja* it is not more developed than in this species.

a. Adult male, 4 feet long: stuffed.
b–c. Half-grown male and female: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.
d. Young male. Lyme Regis. Presented by the Earl of Enniskillen.
e. Half-grown: skin. English coast. From Mr. Yarrell's Collection.
f. Young female. England.

18. **Raja lintea.**

Raja lintea, *Fries, Vet. Akad. Handl.* 1838, p. 154; *Müll. & Henle*, p. 147; *Nilss. Skand. Faun. Fisk.* p. 739; *Kröyer, Danm. Fisk.* iii. p. 1005; *Malm, Œfv. Vet. Ak. Förh.* 1857, p. 193; *Duméril, Elasmobr.* p. 557 (synon. part.).

Snout long, produced, pointed, the width of the interorbital space being one-third of the distance of the eye from the end of the snout. *The anterior profile* (from the snout to the angle of the pectoral fin) *is but slightly emarginate, and not undulated.* Teeth somewhat pointed. The outer pectoral angle is nearly a right one. *Body smooth*, only a few small, stellate ossifications along the front margin of the disk. Lower side entirely smooth. *A median series of distinctly ribbed spines on the tail*, imperfectly continued on the back; sides of the tail with a series of smaller spines. Three spines on each shoulder, and one in front and behind the eye. The width of the disk is equal to the distance from the end of the snout to the hind margin of the ventral fin. Coloration uniform.

Coasts of Northern Europe.

a. Female, 44 inches long: stuffed. Sweden. Presented by Hr. A. W. Malm.

19. **Raja maroccana.**

Bl. Schn. p. 367; *Müll. & Henle*, p. 150, pl. 48. fig. 2; *Duméril, Elasmobr.* p. 559.

Snout long, produced, pointed, the width of the interorbital space being nearly two-sevenths of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral) is slightly emarginate and undulated. Teeth conical and pointed in the male, in 41 series in the upper jaw. The outer pectoral angle is a right one. Body with minute asperities along the middle of the back and the margins of the disk; lower side smooth, except the snout, which is rough. *A series of spines along the superciliary margin*; two or three spines in the median line of the shoulder. Tail with a median series of spines, *alternately larger and smaller*, with the base deeply ribbed; sides of the tail with a series of spines. Coloration uniform.

Marocco? North America.

a. Adult male. Old Collection.

Læviraja bramante, Sassi, Nuov. Annal. Sc. nat. Bologn. 1846, vi. p. 386; and Canestrini, Mem. Accad. Torin. xxi. 1865, p. 361, pl. 1.

figs. 2–5, from the Mediterranean, may be identical with this species. It is true that the chief character, viz. the unequal size of the median spines, is not indicated in the figure; but then this figure cannot be very accurate, as, for instance, the supraorbital spines, mentioned in the description, are omitted.

20. Raja smithii.

Müll. & Henle, p. 150, pl. 48. fig. 1; *Duméril, Elasmobr.* p. 553.

Snout long and pointed, the width of the interorbital space being nearly one-fourth of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral fin) is but slightly emarginate. The outer pectoral angle is nearly a right one. Upper parts of the body covered with minute, rather distant, four- or five-rooted ossifications; lower parts smooth. A series of strong spines radiated longitudinally and transversely along the median line of the back and tail; no spines on the side of the tail. Teeth in 28 series in the upper jaw, with a pointed keel in the female. Dark brown above, white below.

South Africa; Bosphorus?

a. Type of the species: skin of a female, 21 inches long. Presented by Sir A. Smith.

21. Raja fullonica.

Shagreen Ray.
Raja, sp. no. 6, *Artedi, Gen.* p. 72, and *Synon.* p. 101.
Raja fullonica, *L. Syst. Nat.* i. p. 396; *Ascan. Ic.* tab. 43; *Bl. Schn.* p. 367; *Risso, Ichth. Nice*, p. 6 (not *Eur. Mérid.*); *Fries, Vet. Ak. Handl.* 1838, p. 150, tab. 2. fig. 2; *Müll. & Henle*, p. 145; *Yarr. Brit. Fish.* 2nd edit. ii. p. 578, and 3rd edit. iii. p. 577; *Kröy. Danm. Fisk.* iii. p. 296.
Shagreen Ray, *Penn. Brit. Zool.* iii. p. 77, and, ed. 1812, iii. p. 117; *Couch, Fish. Brit. Isl.* i. p. 117, pl. 29.
Raja granulosa, *Bl. Schn.* p. 368.
—— flossada, *Risso, Eur. Mérid.* iii. p. 145.
—— chagrinea, *Montag. Werner. Mem.* ii. p. 420, pl. 21; *Parnell, Trans. R. Soc. Edinb.* 1840, xiv. p. 144, or *Werner. Mem.* vii. p. 431, pl. 41; *Jenyns, Man.* p. 513; *Duméril, Elasmobr.* p. 560.
—— aspera, *Flem. Brit. An.* p. 172.

Snout long, produced, pointed, the width of the interorbital space being one-third of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral fin) is distinctly emarginate and undulated. Teeth slender, pointed in both sexes, in about 60 rows in the upper jaw. The outer pectoral angle is a right one. Body covered with minute asperities above and below; but in the male large patches are naked. A series of spines along the superciliary margin; a median series of spines between the occiput and dorsal cartilage; scarcely any spines between the latter point and the tail. *Back of the tail with a double series of strong spines, none along the median line.* The width of the disk is equal to the distance from the end of the snout to the hind margin of the ventral fin. Coloration uniform.

Coasts of Europe.

a–b. Adult males: stuffed. Firth of Forth.
c. Adult female: skin. Purchased of Mr. Yarrell.
d. Half-grown female: stuffed. Madeira. Presented by the Rev. R. T. Lowe.
e. Jaws of adult examples.

22. Raja macrorhynchus.

Læviraja macrorhynchus, *(Rafin.) Bonap. Faun. Ital. Pesce.*
Raja mucosissima, *Nardo, Isis*, 1827, pp. 476, 482.
—— macrorhyncha, *Duméril, Elasmobr.* p. 566.

Snout long and pointed, the width of the interorbital space being one-fourth of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral fin) is deeply concave. The outer pectoral angle is a right one. Body smooth in young examples, but partly covered with minute asperities in older. *Larger spines on the tail only where they stand in one or three series.* Teeth in 50 series in the upper jaw, rather obtuse in the female, and with a pointed keel in the male. Disk broader than long. Brown above and below; lower surface with numerous dark-coloured openings of the mucous ducts.

Mediterranean and neighbouring parts of the Atlantic.

a. Male, 30 inches long: stuffed. Madeira. Presented by the Rev. R. T. Lowe.
b. Young female: skin. From Yarrell's Collection.

Raja gaimardi, Valenc. in Gaimard, Voy. Isl. et Groenl. Poiss. pls. 2 & 3; Duméril, Elasmobr. p. 565, from the Arctic regions, is probably identical with this species.

23. Raja vomer.

? Raja acus, *Lacép.* v. p. 665.
Raja vomer, *Fries, Vet. Akad. Handl.* 1838, p. 161; *Müll. & Henle*, p. 144; *Kröy. Danm. Fisk.* iii. p. 1011; *Malm, Œfvers. Vet. Ak. Förhandl.* 1857, p. 193; *Duméril, Elasmobr.* p. 571; *Yarrell, Brit. Fish.* 3rd edit. ii. p. 548.
—— mucronata, *Couch, Cornish Faun.* p. 25, and *Fish. Brit. Isl.* i. p. 93, pl. 19.
Chagreen Ray, *Yarrell, Brit. Fish.* 2nd edit. ii. p. 548.

Snout very long and pointed, the width of the interorbital space being one-sixth of the distance of the eye from the end of the snout. The anterior profile (from the snout to the angle of the pectoral fin) is deeply concave. Outer pectoral angle somewhat pointed. Body covered with minute asperities above and below, but without any larger spines. *Tail with a series of spines along the lower edge, but none in the median line.* Teeth in 46 series in the upper jaw, each with a prominent, pointed keel. The width of the disk is equal to the distance from the end of the snout to the hind margin of the ventral fin. Upper parts with scattered round spots of a darker or lighter colour; greyish below, with black dots and lines.

Coasts of Northern Europe.

a. Female, 50 inches long: stuffed. Sweden. Presented by Hr. A. W. Malm.

24. **Raja oxyrhynchus.**

Læviraja, *Salvian.* p. 149, tab. 52; *Willughby,* p. 71, tab. C 4.
Raja, sp. no. 8, *Artedi, Gen.* p. 72, et *Synon.* p. 101.
Raja oxyrhynchus, *L. Syst. Nat.* p. 395; *Brünn. Ichth. Mass.* p. 2.
—— rostrata, *Risso, Ichth. Nice,* p. 7, and *Eur. Mérid.* iii. p. 156.
—— morula, *Nardo, Prodr. Ichth. Adr. in Isis,* 1827, pp. 476, 483.
—— salviani, *Müll. & Henle,* p. 143 (part.); *Duméril, Elasmobr.* p. 569.
Læviraja oxyrhynchus, *Bonap. Faun. Ital. Pesce.*

Snout as long and pointed as in *R. vomer,* to which it is most closely allied. The anterior profile deeply concave. Outer pectoral angle somewhat pointed. Body smooth in young examples, but more or less covered with minute asperities in old ones. Young examples with some spines at the eyes and in the median dorsal line. *Tail with a median series of spines, and generally with spines along the side.* Teeth pointed.

Mediterranean.

25. **Raja nasuta.**

Müll. & Henle, p. 150.

No specimen is known to exist in collections, and I give here only a copy of the original description contained in Solander's MSS. It appears that a figure accompanied this description, which was also seen by Sir J. Richardson; but it cannot be found now in the collections of drawings made during Cook's voyages:—

Raja (dentibus acutis) ventre glabro, dorso scabro, rostro acuminato, aculeis ad oculos, humeros, trifariisque in cauda.

Habitat in Oceano Australiam alluente prope Totaranui (New Zealand).

Corpus omnino rhombeum, infra læve, albicans, supra aculeis minimis asperum, cinereum, parum nebulosum, marginibus anticis rubicundis. Caput antice productum in rostrum acuminatum, undique asperum, rubicundum. Spinæ quinque vel sex supra orbitas oculorum; duo vel tres supra humeros; numerosæ in cauda in tribus seriebus inæqualibus dispositæ: series intermedia in postica parte dorsi incipit. Cauda corpore $\frac{1}{3}$ brevior, subtus plana in medio linea subaculeata prodita, supra convexa armata spinis trifariis descriptis, prope apicem instructa *pinnis* duabus rotundatis subæqualibus. Pinnæ ventrales in lobulum obtusum desinentes, antice exgerentes processum compressum, obtusum, pinnis breviorem, apice ruberrimum.

Dentes numerosi, acuti.

In multis convenit cum *Raja oxyrincho,* Linn. Syst. Nat. p. 395, sed nullo tuberculo spinoso in dorso, &c.

12. PSAMMOBATIS.

Disk perfectly circular, the snout being very short and overlapped by the anterior portions of the pectoral fins, which form the foremost part of the disk. Tail depressed, with a fold on each side; two small dorsal fins near its extremity, but without distinct terminal fin. Each ventral fin is divided into two by a deep notch, the anterior portion being narrow and enveloped in a very loose skin. Each nostril with two nasal valves, the anterior forming a sort of tube, the posterior triangular. Teeth obtuse.

Southern coasts of South America.

1. Psammobatis rudis.

All the upper parts covered with minute spinous tubercles, placed rather close together; no larger tubercles on the disk, which has a groove along the median line; a series of small thorns along the back of the tail. Eyes rather small, their diameter being about equal to the width of a spiracle. Mouth nearly straight, lower lip vertically folded. The teeth of the upper jaw stand in about thirty-six series. The pectorals cover the anterior portion of the ventrals, but not the posterior. Vent nearly in the middle of the total length. Brown, with darker spots; lower parts whitish.

Southern coasts of South America.

a. Sandy Point. Collected by Dr. Cunningham.

Distance from the snout to the vent	$3\frac{2}{3}$	inches.
Length of the tail	$3\frac{2}{3}$	,,
Width of the disk	5	,,

13. SYMPTERYGIA.

Sympterygia, *Müll. & Henle*, p. 155.

Tail very distinct from the disk, which is of rhombic shape, with a fold on each side. Body rough or with spines. Two dorsal fins on the tail, without spine. Tail with a rudimentary caudal fin. The pectoral fins are united in front, forming the fore part of the snout; ventral fins not divided into two. Nasal valves as in *Raja*.

Hab. —— ?

1. Sympterygia bonapartii.

Müll. & Henle, p. 155, taf. 49.

Snout somewhat pointed. A series of spines along the back and tail. Brown, with round darker spots. (*M. & H.*)

Hab. —— ?

14. PLATYRHINA.

Platyrhina, *Müll. & Henle*, p. 125.

Scarcely distinct from *Sympterygia*, from which it differs in having the caudal fin well developed, and the ventral fins separate.

East Indies.

1. Platyrhina sinensis.

Raja chinensis, *Lacép.* i. pp. 34, 157, pl. 2. fig. 2.
Rhina sinensis, *Bl. Schn.* p. 352.
Platyrhina sinensis, *Müll. & Henle*, p. 125, taf. 43; *Duméril, Elasmobr.* p. 576.

Disk subcircular; snout entirely rounded; tail longer than the disk. Length of the nostril equal to the distance between the nostrils. A row of spines along the median line of the back and tail; two pairs of spines on each side of the shoulder; some spines at the eyes.

China and Japan.

a. Young male. China.

2. Platyrhina schönleinii.

Müll. & Henle, p. 125, taf. 44.

Disk subcircular; snout obtuse; tail as long as the disk. Length of the nostril one-half of the distance between the nostrils. A row of spines along the median line of the back and tail; another row along the root of the pectoral fins. Three spines, one behind the other, on each side of the shoulder. Brown, with darker cross bands and large dark spots. (*M. & H.*)

India.

Fam. 5. TRYGONIDÆ.

The pectoral fins are uninterruptedly continued to and confluent at the extremity of the snout. Tail long and slender, without lateral longitudinal folds; vertical fins none, or imperfectly developed, often replaced by a strong serrated spine.

15. UROGYMNUS.

Urogymnus, *Müll. & Henle, Wiegm. Arch.* 1837, p. 434.
Anacanthus, *Ehrenberg.*
Rhachinotus, *Cantor.*

Tail long, very distinct from the subcircular or elliptic disk, without fin or spine, sometimes with a narrow cutaneous fold below. Body densely covered with osseous tubercles. Pectorals united in front. Teeth flattened.

Indian Ocean.

1. Urogymnus asperrimus.

Raja asperrima, *Bl. Schn.* p. 367.
—— africana, *Bl. Schn.* p. 367.

Anacanthus asperrimus, *Müll. & Henle*, p. 157.
—— africanus, *Müll. & Henle*, p. 157.
Rhachinotus africanus, *Cantor, Mal. Fish.* p. 422; *Bleek. Nat. Tyds. Ned. Ind.* 1853, iv. p. 64.
Urogymnus asperrimus, *Duméril, Elasmobr.* p. 580.
—— africanus, *Duméril, l. c.* p. 581.

The dorsal surface of the head and trunk and the tail are densely covered with osseous tubercles, between which larger erect conical thorns are scattered; the pectoral fins without the small tubercles, but with numerous large thorns, each standing on a circular base.

Indian Ocean; Pinang.

a. Adult female: stuffed (body 4 feet long). India. Presented by T. E. C. Boileau, Esq.
b. Adult female: stuffed. Pinang. From Dr. Cantor's Collection.
c. Adult female: stuffed. African coast.
d–f. Adult females: skins.
g. Adult: skeleton. Seychelles. Presented by Swinburne Ward, Esq.
h. Tail of a large example.

16. ELLIPESURUS.

Elipesurus, *Schomburgk, Fish. Brit. Guian.* ii. p. 184.

Tail short, very distinct from the subcircular disk, without fin but with strong bony, spinous excrescences round the basal portion.

1. Ellipesurus spinicauda.

Schomburgk, l. c. p. 184, pl. 23.

Bright ochreous yellow, reticulated with darker.

Rio Branco, near Fort San Joaquim.

17. TRYGON*.

Trygon, *Adanson, Cours d'Hist. Nat.* ii. p. 170.
Himantura, *Müll. & Henle, Wiegm. Arch.* 1837, p. 400.
Hemitrygon, *Müll. & Henle, Ann. & Mag. Nat. Hist.* 1838, ii. p. 90.
Trygon *et* Hypolophus, *Müll. & Henle, Plagiost.*
Himantura, Paratrygon, Hemitrygon, Trygon *et* Hypolophus, *Duméril, Elasmobr.* pp. 582, 583.

Tail long, tapering, without any fin, or with cutaneous folds not extending to its extremity; it is armed with a long arrow-shaped spine, serrated on each side. Body smooth or with tubercles. Pectorals united in front. Nasal valves coalescent into a quadrangular flap. Teeth flattened.

---

* 1. Trygon purpurea, *M. & H.* p. 160, taf. 51.—South Africa.—Known from a drawing
2. Jabebirete, *Marcgr.* p. 175; Raja guttata, *Bl. Schn.* p. 361; Trygon jabebara, *M. & H.* p. 160.
3. Trygon spinosissima, *Duméril, Elasmobr.* p. 598,—a name given by this author to a mutilated tail in the Paris Museum, said to belong to a species allied to *T. thalassia*.
4. —— atrocissimus, *Blyth, Journ. As. Soc. Beng.* 1860, p. 39, is another name given to a tail of the same or a similar species.
5. —— marginatus, *Blyth, Journ. As. Soc. Beng.* 1860, p. 38.—Bengal.

Seas of the temperate and tropical regions.

The species may be arranged thus:—

- *a. Trygon.* Dental laminæ transverse, not or but slightly undulated.
  - *aa.* Tail without any cutaneous fold (*Himantura*), p. 473.
  - *bb.* Tail with an inferior or superior cutaneous fold (*Trygon*), p. 477.
- *β. Hypolophus.* The upper dental lamina is angularly bent, receiving within its concavity the lower lamina, which is somewhat pointed: p. 482.

α. Trygon. *Dental laminæ transverse, not or but slightly undulated.*

aa. *Tail without any cutaneous fold.*

1. Trygon uarnak.

Raja uarnak, *Forsk. Descr. Anim.* p. 18.
Trygon russellii, *Gray, Ind. Zool.* c. fig.
Pastinachus uarnak, *Rüpp. N. W. Fisch.* p. 69, pl. 19. figs. 2 *a* & 2 *b*.
Trygon uarnak, *Müll. & Henle*, p. 158; *Cant. Mal. Fish.* p. 423; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 69; *Blyth, Journ. As. Soc. Calc.* 1860, p. 44; *Duméril, Elasmobr.* p. 585; *Day, Fish. Malab.* p. 277.
—— variegatus, *M'Clell. Calc. Journ. Nat. Hist.* 1841, i. p. 60, pl. 2. fig. 2; *Blyth, Journ. Asiat. Soc. Beng.* 1860, p. 43; *Duméril, l. c.* p. 43.
—— uarnacoides, *Bleek. l. c.* p. 72, or *Nat. Tyds. Ned. Ind.* iii. p. 738; *Duméril, l. c.* p. 586.
—— undulatus, *Bleek. l. c.* p. 70; *Duméril, l. c.* p. 586.
—— pareh, *Bleek. l. c.* p. 71, or *Nat. Tyds. Ned. Ind.* v. p. 461; *Duméril, l. c.* p. 590.
—— pastinacoides, *Bleek. l. c.* p. 75.
—— ellioti, *Blyth, Journ. As. Soc. Beng.* 1860, p. 41.

Tail without cutaneous fold, exceedingly long and slender, about thrice as long as the disk. The snout is rather pointed, forming a distinct projection in the anterior profile, the margins meeting at an angle which is fully or less than a right one. One or more large tubercles in the middle of the back: young examples are smooth; but with progressing age the neighbourhood of the central tubercles becomes covered with small tubercles, which gradually spread over the entire dorsal surface of the head and trunk, and finally envelope the tail also. There is, besides, much variation in the development of these small tubercles, according to the individuals. There are no large tubercles in the median line of the tail. Disk about as broad as long. Uniform brown, or with numerous dark-brown spots; tail of the young with alternate brown and whitish rings.

Indian Ocean and archipelago.

a. Half-grown male: stuffed. Red Sea. Purchased of Dr. Rüppell.
b. Adult. Zanzibar. Presented by Lieut.-Col. Playfair.
c. Part of head of large example. Seychelles. Presented by Lieut.-Col. Playfair.
d. Adult male (body 3 feet long, tail 9 feet): stuffed. Madras. Presented by T. C. Jerdon, Esq.
e. Adult female: stuffed. Madras. Presented by T. C. Jerdon, Esq.
f–g. Young: stuffed. Pinang. From Dr. Cantor's Collection.
h–k. Young: stuffed. India.
l. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.
m. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.—One of the types of *T. undulatus*.
n. Adult. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *Trygon pareh*.
o. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *T. pastinacoides*.
p. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *T. uarnacoides*.

2. **Trygon gerrardi.**

Trygon gerrardi, *Gray, Chondropt.* p. 116.
—— macrurus, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 74; or *Nat. Tyds. Ned. Ind.* iii. p. 607.

Scarcely distinct from *T. uarnak*.

Tail without cutaneous fold, exceedingly long and slender, about thrice as long as the disk, without tubercles at the base. The snout is rather obtuse, the margins forming an obtuse angle. One or more large tubercles in the centre of the back, round which, or in front of which, generally smaller tubercles are grouped forming a small patch or short band, and not extending beyond the central portion of the disk. Disk broader than long. *Brown, with round yellowish spots* limited to the posterior parts in young examples, which have the tail ornamented with alternate brown and yellow rings.

East-Indian archipelago. Japan.

a–b. Young: stuffed. India.—Types of the species.
c. Young. East-Indian archipelago. From Dr. Bleeker's Collection.—Type of *T. macrurus*.
d, *e*. Half-grown. Japan. Purchased of Mr. Jamrach.

3. **Trygon punctata.**

Allied to *T. uarnak*.

Tail without cutaneous fold, entirely smooth, and exceedingly long and slender, about thrice as long as the disk. *The snout is obtuse*, the margins forming an obtuse angle. The greatest width of the nasal valve is one-half of the length of the præoral portion of the snout. Two large tubercles in the centre of the disk, a few small ones in the same median line; otherwise the body is entirely smooth. Disk a little broader than long. *Brownish grey, with numerous small brown spots*; tail blackish.

? East-Indian archipelago.

a. Purchased of Hr. Frank.—Length of the disk 10 inches; of the tail 36 inches.

4. Trygon bleekeri.

Blyth, Journ. As. Soc. Beng. 1860, p. 41.

"Plain dark brown *above and below*, with a narrowish white median patch on the belly. Peak, or anterior junction of pectorals, considerably more prolonged and pointed than in the others. Median third of dorsal surface studded with intermixed larger and smaller round flat tubercles, continued along the upper surface of the tail as far as the caudal spines, then thickly covering the whole tail to its extremity in adults, or with a naked line below in specimens more than half-grown. Along the median line of the tail above, the tubercles are not larger than the rest. The usual large round tubercle on centre of back, and commonly three smaller, set in form of a triangle, before it, and three similar behind it. Length of one 25 inches to base of tail, the tail 72 inches; of another, 15 and 56 inches."

Bengal.

5. Trygon walga.

Trygon walga, *Müll. & Henle, Plag.* p. 159 (descript. part., not fig.); *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 67; *Blyth, Journ. As. Soc. Beng.* 1860, p. 40.
—— heterurus, *Bleek. l. c.*; *Duméril, Elasmobr.* p. 591.
—— imbricata, *Cant. Mal. Fish.* p. 425 (not. synon.).
—— dadong, *Bleek. Nat. Tyds. Ned. Ind.* x. p. 355; *Duméril, l. c.* p. 591.

Tail without cutaneous fold, rather longer than the disk. Snout acutely pointed, projecting. Interorbital space and back of the trunk covered with small tubercles, *without larger ones in the median line. A series of short spines between the root of the tail and the large spines.* Disk nearly as broad as long. Coloration uniform.

East Indies.

a. Stuffed. Bay of Bengal. From the Collection of the Zoological Society.
b. Skin. Pinang. From Dr. Cantor's Collection.
c. East-Indian archipelago. From Dr. Bleeker's Collection.
d. Type of *T. heterurus*. Java. From Dr. Bleeker's Collection.—Tail injured and deformed.

6. Trygon polylepis.

Russell, tab. 4.
Trygon polylepis, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 73; *Duméril, Elasmobr.* p. 590.
—— walga, *Duméril, Elasmobr.* p. 589 (not synon.).

Tail without cutaneous fold, about as long as the disk. Snout acutely pointed, projecting. Interorbital space covered with small tubercles; a narrow band of similar tubercles runs along the median line of the back to the caudal spine, widening in the scapular region, thus forming a sort of cross. There are a few indistinct larger tubercles in the median line of the scapulary region, *but none on the tail*. Disk a little longer than broad.

Indian Seas.

a. Adult male: skin. Ceylon. From Dr. Kelaart's Collection.

7. Trygon nuda.

Russell, tab. 5.
Trygon walga, *Müll. & Henle*, p. 159, part. taf. 50.

Tail without cutaneous fold, one-half longer than the disk. Snout rather pointed and projecting, the margins meeting at a right angle. *Body and tail entirely smooth*, without tubercles in old and young individuals. Disk as broad as long, or rather broader.

Indian Seas.

a. Adult male (disk 11 inches long): stuffed.
b–c. Young. Singapore.
d. Young: stuffed. India. Presented by W. Masters, Esq.

8. Trygon hastata.

?? Raja centroura, *Mitch. Lit. & Phil. Trans. New York*, i. p. 479.
Pastinaca hastata, *Dekay, New York Faun. Fish.* p. 373, pl. 65. fig. 214.
Trygon hastata, *Storer, Mem. Amer. Acad.* ii. p. 513.

Tail without cutaneous fold, rather longer than the disk. The anterior margins meet at a nearly right angle. From a point slightly anterior to the centre of the body commences a triple longitudinal series of small horny tubercles, descending along and on each side of the median line for a short distance on the anterior portion of the tail. Tail armed with two spines, placed at a distance from each other. Disk nearly as long as broad. Coloration uniform. (*Dekay*.)

New York.

This is the description after Dekay; however, Storer describes and figures under the same name (*Pastinaca hastata*, Mem. Am. Acad. ix. 1867, p. 244, pl. 39. fig. 3) a Sting-Ray which does not show "the triple longitudinal series of small horny tubercles;" so that, if this character be not constant, the validity of the species appears doubtful. As long as the North-American Rays are not properly compared with series of well-determined European species, their determination will remain obscure.

9. Trygon strongyloptera.

Trygon strogylopterus, *Schomburgk, Fish. Brit. Guian.* ii. p. 183, pl. 22; *Müll. & Trosch. in Schomb. Reisen*, iii. p. 642.

Tail without any fold, one-third shorter than the disk, extremely thin behind the spine. Disk rounded, ovate, rather longer than broad. Eyes very small. Upper parts rough. There are two larger thorns with broad base on the root of the tail. Disk with undulating markings, posteriorly crossing the fin-rays. (*M. & T.*)
British Guiana.

bb. *Tail with an inferior or superior cutaneous fold.*

10. Trygon thalassia.

Pastinaca, *Bellon. De Aquat.* p. 94; *Gesner, De Aquat.* p. 77; *Willughby*, p. 67, tab. D 5. fig. 3.
Trygon thalassia, *Columna, Physobatos*, p. 105, tab. 28.
Raja gesneri, *Cuv. Règne Anim.*
Trygon thalassia, *Müll. & Henle*, pp. 161, 197.
Pastinaca acanthura, *Gronov. Syst.* ed. *Gray*, p. 12.

Tail with a cutaneous fold along the lower side, the depth of the fold being less than that of the tail. Tail much longer than the body (but generally mutilated in old examples). Anterior profile obtuse. Large conical thorns, in greater or less number, inserted on a round radiated base, are distributed along the middle of the back, on the scapulary and other regions, and especially on the tail, where they occupy the sides as well as the upper surface; even the cutaneous fold is covered with smaller stellate ossifications.

Adriatic and probably Atlantic.—A similar species exists in the Pacific, with a deeper caudal fin; but this is known to me from a tail only.

a. Large example, stuffed: body 4 feet long.
b. Large male. Madeira. Presented by J. Y. Johnson, Esq.
c–f. Tails of very large examples.
g–h. Jaws of large examples.

11. Trygon brucco.

Bonap. Faun. Ital. Pesc.; *Duméril, Elasmobr.* p. 602.

Tail with a distinct cutaneous fold below, *nearly twice as long as the disk*. The anterior profile of the disk is scarcely interrupted by a projection of the snout, forming a nearly continuous arch. Body smooth. Brownish above, white below.
Mediterranean.

a. Skin of an adult example, without tail. From Mr. Yarrell's Collection.

12. Trygon violacea.

Bonaparte, Faun. Ital. Pesc.; *Müll. & Henle*, pp. 162, 200.

Tail with a distinct cutaneous fold below, more than twice as long as the disk. The anterior profile of the disk is a continuous arch, not interrupted by the projection of the snout. A series of thorns in the median line of the back to the caudal spine, and some others in the scapulary region. Older individuals with scattered asperities on the head and back, young ones entirely smooth. Dark violet above, lighter violet below.

Mediterranean.

13. Trygon pastinaca.

The Sting-Ray.

Pastinaca marina, *Bellon. De Aquat.* p. 94; *Rondel. De Pisc.* p. 331; *Salvian.* p. 144, tab. 49; *Willughby*, p. 67, tab. C 3.

Raja, sp. nos. 3 & 4, *Artedi, Synon.* p. 100, et *Gen.* p. 71; *Gronov. Mus. Ichth.* i. p. 64. no. 141.

Raja pastinaca, *L. Syst. Nat.* i. p. 396; *Bl.* taf. 82; *Bl. Schn.* p. 360; *Donovan, Brit. Fish.* v. pl. 99; *Turton, Brit. Faun.* p. 112; *Risso, Ichth. Nice*, p. 10.

Duhamel, Pesches, iii. sect. ix. p. 282, pl. 9. fig. 8.

Sting-Ray, *Pennant, Brit. Zool.* iii. p. 83, or, edit. 1812, iii. p. 125.

Trygon vulgaris, *Risso, Eur. Mérid.* iii. p. 160.

Trygonobatus pastinaca, *Blainv. Faun. Franç.* p. 35, pl. 6. figs. 1 & 2.

Trygon lymma, *Geoffr. St.-Hil. Descr. Eg. Poiss.* p. 219, pl. 27. fig. 1.

—— pastinaca, *Cuv. Règne Anim.*; *Flem. Brit. An.* p. 170; *Müll. & Henle*, p. 161; *Bonap. Faun. Ital. Pesc.*; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 588, or 3rd edit. ii. p. 591; *Jenyns, Man.* p. 518; *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 474; *Nilss. Skand. Faun. Fisk.* p. 741; *Parnell, Werner. Mem.* vii. p. 440, pl. 43; *Kröyer, Danm. Fisk.* iii. p. 1018; *Couch, Fish. Brit. Isl.* i. p. 130, pl. 31; *Duméril, Elasmobr.* p. 600.

Pastinaca lævis, *Gronov. Syst.* ed. *Gray*, p. 11.

Trygon akajei, *Müll. & Henle*, p. 165, taf. 53; *Schleg. Faun. Japon. Poiss.* p. 308; *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Japan*, iv. p. 44; *Duméril, l. c.* p. 604.

Raja sayi, *Lesueur, Journ. Ac. Nat. Sc. Philad.* 1817, i. p. 42.

Trygon sayi, *Müll. & Henle*, p. 166; *Duméril, Elasmobr.* p. 603.

Myliobatis sayi, *Storer, Mem. Amer. Acad.* ii. p. 514.

Tail with a distinct cutaneous fold below and a slight ridge above, *about one-half longer than the disk, or rather shorter. The margins of the snout form an obtuse angle.* Body smooth, sometimes a few small tubercles, pointing backwards, in the median line of the scapulary region. Three (five) appendages at the bottom of the mouth, behind the teeth. Coloration uniform, or sometimes with small round scattered whitish, non-ocellated spots.

Atlantic, China, and Japan.

a–c. Half-grown and young: stuffed. Plymouth. Presented by Lieut. H. F. Spence, R.N.

d. Adult female. North America.

e. Young male. Lanzarote. Presented by the Rev. R. T. Lowe.

f–g. Half-grown: skins. Jamaica. Purchased of Mr. Parnell.

h. Half-grown. West Indies. From the Collection of the Zoological Society.

i. Barbadoes. Presented by Sir R. Schomburgk.

k–l. Young. New Orleans. From M. Sallé's Collection.

m. Half-grown. British Guiana. Collected by Hr. Ehrhardt.

n. Half-grown. Bahia. From Dr. Wucherer's Collection.

o. Young. Amoy. From Consul Swinhoe's Collection.

p–q. Young. Japan. Purchased of Mr. Jamrach.

Variety. Olive-coloured, marbled with brown.

a. Half-grown. Presented by Sir A. Smith.
b. Half-grown: stuffed. Presented by Sir A. Smith.

14. Trygon kuhlii.

Müll. & Henle, p. 164, pl. 50; *Schleg. Faun. Japon. Poiss.* p. 308; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 73; *Duméril, Elasmobr.* p. 603.

Tail with a distinct cutaneous fold above and below, about one-half longer than the disk. The margins of the snout form an obtuse angle. Body entirely smooth, or with a series of spines, pointing backwards, along the median line of the back to the caudal spine. Only two appendages at the bottom of the mouth, behind the teeth. Upper parts with some scattered bluish black-edged ocelli.

Indian Ocean and archipelago.

a, b, c, d, e–f. Adult, half-grown, and young. Zanzibar. Presented by Lieut.-Col. Playfair.
g, h, i. Half-grown and young. East-Indian archipelago.

15. Trygon margarita.

Tail with a distinct cutaneous fold below, but without one above; it is twice and a half as long as the disk, which is scarcely longer than broad. The anterior margins of the disk would meet at a somewhat obtuse angle, but the foremost part of the snout is produced into a short point. Sides of the disk entirely rounded, smooth; *a single large round tubercle, like a pearl, in the centre of the back*, sometimes a trace of a second in front of the large one. Three appendages at the bottom of the mouth, behind the teeth; another much smaller appendage on each side of the three long middle ones. Uniform brownish above, whitish below.

West Africa.

a. Disk 8½ inches long, tail 19 inches. Purchased of Mr. J. Wood.
b. Young. From the Collection of the Zoological Society.

16. Trygon rudis.

Tail with a distinct cutaneous fold below, but without upper ridge, one-half longer than the disk, which is considerably broader than long, with very distinct outer angles. Snout somewhat pointed, the anterior profile of the disk being concave. All the upper parts and the tail are rough from minute, dense asperities; there are no larger tubercles on the body; but on the middle of the tail the ossifications are somewhat larger and with a stellate base. Uniform brown.

Old Calabar.

a. Adult female: stuffed; disk 6½ feet broad and 4½ feet long, tail 6 feet (slightly mutilated). Presented by G. Nimmo, Esq.

17. Trygon ukpam.

Hemitrygon ukpam, *J. Alex. Smith, Proc. R. Phys. Soc. Edinb.* 1859, p. 64.

Characters of new-born individuals.—Body 11 inches long and nearly as broad, tail 30 inches. Outline uniformly rounded. Upperside of the body rough, granular, the granular appearance diminishing towards the pectoral fins, whilst the granules become larger and circular in shape towards the mesial line of the fish, which from the posterior half of the body gives indications of larger circular plates or shields; these become still larger towards the root of the tail, and cease in the mesial line a little beyond it. Beyond the spine a smaller double range of oval-shaped obliquely placed bony scales or granules can be traced along the sides of the tail. Five papillæ at the bottom of the mouth behind the lower teeth. Tail without ridge above, but with a distinct fringe below.—Old examples very rough and spiny above. (*Smith.*)

Old Calabar. Attains to a size of four feet in width.

18. Trygon bennettii.

Trygon bennettii, *Müll. & Henle*, p. 160, taf. 52; *Duméril, Elasmobr.* p. 595.

—— carnea, *Richards. Ichth. Chin.* p. 197.

Tail with a rather low cutaneous fold along the lowerside, about thrice as long as the disk, which is about as broad as long. Snout rather pointed, the margins meeting at a right angle. Young examples entirely smooth; in older ones a tubercle in the middle of the back, which is gradually surrounded by smaller scale-like tubercles, extending backwards to the caudal spine. Coloration uniform.

Indian and Atlantic Oceans.

a. Young. China. Presented by J. R. Reeves, Esq.—Type of the species.

b. Young: skin. India. Presented by T. E. J. Boileau, Esq.

c. Young. British Guiana. Purchased.

19. Trygon tuberculata.

Trygon tuberculatus, *Lacép.* ii. p. 106, pl. 4. fig. 1; *Duméril, Elasmobr.* p. 605.

—— sabina, *Lesueur, Journ. Ac. Nat. Sc. Philad.* iv. p. 109; *Müll. & Henle*, p. 163; *Duméril, l. c.* p. 607.

—— gymnura, *Müll. in Erman's Reise*, p. 25, taf. 13.

—— osteosticta, *Müll. l. c.* p. 25, taf. 14.

Tail with a distinct cutaneous fold below, a very low upper fold being as frequently present as absent. *The tail is more than twice as long as the disk.* Snout pointed and rather produced. A series of spinous tubercles, each with the point directed backwards, runs from the scapulary region to the caudal spine; older individuals having the upperside of the head and trunk more or less extensively covered with small tubercles which do not touch one another. Minute tubercles on the tail. Very young individuals are probably entirely naked. Three papillæ at the bottom of the mouth behind the teeth. Dental laminæ much undulated. Coloration uniform.

American parts of the tropical Atlantic; Sydney.

a. Fine specimen (disk 15 inches long). South America. Presented by Sir R. Schomburgk.
b. Young. Island of Grenada. Purchased of Mr. Higgins.
c. Young. Lake Champlain. Purchased of M. Parzudaki.
d. Young. United States.
e. Half-grown.
f. Adult (disk 20 inches long). Sydney. Purchased of Mr. Gerrard.

20. Trygon imbricata.

Raja imbricata, *Bl. Schn.* p. 366.
Trygon imbricata, *Müll. & Henle*, p. 164; *Duméril, Elasmobr.* p. 606.

Tail scarcely as long as the body, with very low cutaneous folds, the upper a little higher than the lower. Disk as long as broad. The margins of the snout form a right angle. Two appendages at the bottom of the mouth, behind the teeth. Small tubercles on the nape and back; they form a rhombic figure on the back of adults. A series of thorns in the median line of the back and on the shoulder. A band of scale-like tubercles on the tail, from its root to the spine, so arranged that pairs of small ones alternate with single larger ones. (*M. & H.*)

Indian seas.

21. Trygon zugei.

Trygon zugei, *Müll. & Henle*, p. 165, pl. 53; *Schleg. Faun. Japon. Poiss.* p. 309; *Cant. Mal. Fish.* p. 426; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 68; *Duméril, Elasmobr.* p. 606.
—— crozieri, *Blyth, Journ. As. Soc. Beng.* 1860, p. 45.

Tail with a distinct cutaneous fold above and below, one-half longer than, or twice as long as, the disk. *Snout considerably produced and pointed.* Entirely smooth or with a series of pointed tubercles in the median line of the back to the caudal spine. Dental laminæ much undulated. Uniform brown above.

Japanese and Indian seas.

a. Half-grown. Japan. Purchased of Mr. Jamrach.
b–c. Young: skins. From Chinese insect-boxes. Presented by J. Brenchley, Esq.
d. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
e. Young: skin. Pinang. From Dr. Cantor's Collection.
f–g. Young, in bad state. From Dr. Cantor's Collection.
h. Young, in bad state. Madras. Presented by Capt. Mitchell.

22. Trygon hystrix.

Trygon hystrix, *Müll. & Henle*, p. 167; *D'Orbigny, Voy. Am. Mér. Poiss.* pl. 15; *Schomburgk, Fish. Brit. Guiana*, ii. p. 180, pl. 20; *Duméril, Elasmobr.* p. 608.
—— garapa, *Schomburgk, l. c.* p. 182, pl. 21; *Müll. & Trosch. in Schomb. Reis.* iii. p. 642.

Tail with a distinct cutaneous fold above and below, longer than the disk. Disk ovate, entirely rounded in front. Upper surface entirely covered with very small asperities, not densely placed, and each with a stellate base. Only the margins of the disk are naked. A row of thorns along the back of the tail to the spine; old individuals with additional thorns on the sides of the tail. Four (two) appendages at the bottom of the mouth behind the teeth. Brown with round whitish spots, or reticulated with black.

Guianas and Brazil.

a. Fine specimen. Surinam. Purchased of Hr. Kappler.—The tail is perfect, and terminates in a slender, finless point, as in other Trygons.
b. Young male. Santarem (R. Amazons). From Mr. Bate's Collection.—Entirely naked.

23. Trygon orbicularis.

Aiereba, *Marcgr.* p. 175 (cop. by *Jonston. De Pisc.* tab. 38. fig. 6, and *Willughby*, p. 68, tab. C 1. fig. 2).
Raja orbicularis, *Bl. Schn.* p. 361.
Trygon aiereba, *Müll. & Henle*, pp. 160, 196.
Paratrygon aiereba, *Duméril, Elasmobr.* p. 594 (cop. *M. & H.*).

Tail with a very low cutaneous fold above, but not below, scarcely longer than the disk. Disk ovate, without projecting snout. Eyes extremely small; spiracle with a very conspicuous projection behind. Upper parts with small asperities, without larger tubercles. Coloration uniform. (*M. & H.*)

Brazil.

β. Hypolophus. *The upper dental lamina is angularly bent, receiving within its concavity the lower lamina, which is somewhat pointed.*

24. Trygon sephen.

Raja sephen, *Forsk. Descr. An.* p. 17; *Gm. L.* i. p. 1508; *Lacép.* i. p. 123; *Bl. Schn.* p. 364.
Russell, Fish. Corom. i. p. 2, pl. 3.
Trygon sephen, *Cuv. Règne An.*; *Rüpp. Atl. Fisch.* p. 52, and *N. W. Fisch.* p. 69.
Raja sancur, *Ham. Buch.* p. 2; *Blyth, Journ. As. Soc. Beng.* 1860, p. 37.
Trygon forskalii, *Rüpp. Atl. Fisch.* p. 53, taf. 13. fig. 2.
Hypolophus sephen, *Müll. & Henle*, p. 170; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 77; *Cant. Mal. Fish.* p. 429; *Duméril, Elasmobr.* p. 616; *Day, Fish. Malab.* p. 279.

Tail with a broad cutaneous fold below, but without one above, about thrice as long as the disk. Disk rhombic, with obtuse angles.

The upper parts densely covered with flat scale-like tubercles; several large globular tubercles in the median line of the scapulary region. Coloration uniform.

Red sea; Indian seas.

a–d. Adult, half-grown, and young: stuffed. Indian Ocean.
e. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
f. Young: skin. Pinang. From Dr. Cantor's Collection.
g. Tail of adult. Seychelles. Presented by Lieut.-Col. Playfair.

18. TÆNIURA*.

Tæniura, *Müll. & Henle*.

These fishes are scarcely generically distinct from *Trygon*. The tail is provided below with a rayless cutaneous fold extending to its extremity.

Indian seas; fresh waters of tropical America.

1. Tæniura lymma.

? Raja lymma, *Forsk. Descr. An.* p. 17.
Trygon lymma, *Cuv. Règne An.*; *Rüpp. Atl. Fisch.* p. 51, taf. 13. fig. 1, and *N. W. Fisch.* p. 69.
—— ornata, *Gray, Ind. Zool*
—— halgani, *Less. Voy. Coq. Zool.* ii. p. 100, *Poiss.* pl. 3.
Tæniura lymma, *Müll. & Henle*, pp. 171, 197; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 78; *Cant. Mal. Fish.* p. 430; *Duméril, Elasmobr.* p. 619.

Disk a little longer than broad, entirely rounded on the sides, with the posterior angles pointed. Nasal valve with very small fringes. Two long papillæ on the bottom of the mouth. Tail much longer than the disk. Disk smooth, sometimes with a few very small thorns along the median line of the back. Greyish with rounded blue, dark-edged spots; a bluish band along each side of the tail.

Indian Ocean and archipelago.

a. Adult: stuffed. Red Sea.
b, *c*, *d*. Half-grown. Zanzibar. Presented by Lieut.-Col. Playfair.
e, *f*, *g*. Half-grown. Singapore.
h, *i*. Adult and half-grown. East-Indian archipelago.
k. Young. Ceram. Purchased of Mr. Stevens.
l, *m*, *n*. Young.

2. Tæniura meyeni.

Müll. & Henle, p. 172, taf. 54; *Duméril, Elasmobr.* p. 620.

Disk subcircular, a little broader than long, with the posterior angles rounded. Nasal valve slightly fringed. Five papillæ on the bottom of the mouth. Tail nearly as long as the disk. Disk smooth. Blackish brown above, white below with dark margins.

Mauritius.

---

* 1. Tæniura magdalenæ, *Duméril, Elasmobr.* p. 625.—Rio Magdalena.
2. Pastinaca humboldtii, *Roulin, Ann. Sc. Nat.* 1829, xvi. p. 104. pl. 3.—R. Meta.

3. Tæniura melanospila.

Tæniura melanospilos, *Bleek. Nat. Tyds. Ned. Ind.* 1853, iv. p. 513.

Disk subcircular, somewhat broader than long. Nasal valve slightly fringed. Two papillæ on the bottom of the mouth. Tail a little longer than the disk. Upper surface of the body entirely covered with minute spines; a row of larger thorns along the median line of the back. Also the tail is rough. Greyish, with numerous black spots and dots. (*Blkr.*)

Batavia.

4. Tæniura grabata.

Trygon grabatus, *Geoff. St.-Hil. Descr. Eg. Poiss.* p. 218, pl. 25. figs. 1 & 2.

Tæniura grabata, *Müll. & Henle*, p. 172; *Duméril, Elasmobr.* p. 621.

Disk circular; tail about as long as the disk. Upper parts covered with minute spines with a radiated base. Reddish grey above, white below. (*Geoffr.*)

Red Sea.

5. Tæniura motoro.

Tæniura motoro, *Müll. & Henle*, p. 197; *Duméril, Elasmobr.* p. 624.

Disk ovate, with the posterior angles rounded, entirely covered with very small stellate ossifications, no larger tubercles being interspersed between them. A series of strong thorns along the back of the tail, and sometimes other smaller ones on its sides. Tail as long as, or rather longer than, the disk. Five papillæ on the bottom of the mouth. Brownish, with round yellow spots which, sometimes, are edged with black.

Brazil (R. Cuyaba).

a. Adult male: stuffed. South America.

Tæniura mülleri, Casteln. An. Am. Sud, Poiss. p. 102, pl. 48. fig. 2; Duméril, Elasmobr. p. 621; = *Tæniura dumerilii*, Casteln. *l. c.* p. 101, pl. 48. fig. 1; Duméril, *l. c.* p. 622; probably = *Tæniura henlei*, Casteln. *l. c.* p. 102, pl. 48. fig. 3; Duméril, *l. c.* p. 623, appears to be most closely allied to *T. motoro*, but the stellate ossifications are unequal in size, larger ones being mixed with smaller. From the materials existing in collections, it is impossible to decide whether this is a specific difference.

6. Tæniura orbignyi.

Tæniura d'orbignyi, *Casteln. An. Am. Sud*, p. 102, pl. 49. fig. 1; *Duméril, Elasmobr.* p. 624.

Disk ovate, longer than broad, covered with asperities, some of considerable size being mixed with minute ones. A row of large thorns along the back of the tail, pointing backwards. Brownish with darker spots. (*Cast.*)

Tocantins.

19. UROLOPHUS.

Urolophus *et* Trygonoptera, *Müll. & Henle.*

Tail of moderate length, with a distinct rayed terminal fin, armed with a serrated spine, without or with a rudimentary dorsal fin. Pectorals united in front. Mouth and teeth as in *Trygon.*

Australian and Caribbean seas.

a. No dorsal fin: Urolophus.

1. Urolophus cruciatus.

Raja cruciata, *Lacép. Ann. Mus.* iv. pp. 201, 210, pl. 55. fig. 2.
Urolophus aurantiacus, *Müll. & Henle,* p. 173, taf. 55.
—— ephippiatus, *Richards. Voy. Ereb. & Terr. Fish.* p. 35, pl. 24.
—— cruciatus, *Duméril, Elasmobr.* p. 626.
—— ephippiatus, *Duméril, l. c.* p. 627.

Disk rather broader than long, the anterior margins being straight, and meeting at an obtuse angle; snout not projecting. Skin entirely smooth. Tail shorter than the disk. Yellowish, uniform or with one or three blackish longitudinal bands crossed by others of the same colour.

Australian seas.

a. Type of *U. ephippiatus.* Port Arthur. From the Haslar Collection.

2. Urolophus armatus.

Müll. & Henle, p. 174; *Duméril, Elasmobr.* p. 628.

Disk rather broader than long; snout rather projecting. Upper parts with small spinelets; a large tubercle in the centre of the scapulary region. Tail scarcely shorter than the disk. Brown, with numerous black dots.

New Ireland.

3. Urolophus torpedinus.

Pastinaca marina, *Sloane, Jam.* p. 277, pl. 246. fig. 1.
Trygonobatus torpedinus, *Desmar. Ichth.* dec. I. p. 6, pl. 1.
Raja jamaicensis, *Cuv. Règne An.*; *Bancroft, Zool. Journ.* v. p. 83 (Raja sloani).
Urolophus torpedinus, *Müll. & Henle,* p. 173, pl. 55; *Poey, Mem. Cub.* ii. p. 360; *Duméril, Elasmobr.* p. 628.
—— halleri, *Cooper, Proc. Calif. Ac. Nat. Sc.* iii. p. 95.
Urotrygon mundus, *Gill, Proc. Ac. Nat. Sc. Philad.* 1863, p. 173.

Disk ovate, longer than broad. Upper parts with distant, minute spinelets. Tail rather shorter than the disk in adult examples. All the upper parts with numerous yellow, dark-edged ocelli; sometimes of a more uniform colour.

West Indies, and Pacific coasts of Central America.

a, b. Adult and young. Jamaica. Purchased of Mr. Higgins.
c–f. Adult and half-grown: skins. Jamaica. Purchased of Mr. Parnell.
g, h. Adult. West Indies.

β. *A rudimentary dorsal fin in front of the caudal spine*: Trygonoptera.

4. Urolophus testaceus.

Trygonoptera testacea, *Müll. & Henle*, p. 174, taf. 56.
—— müllerii, *Steindachner. Sitzgsber. Ak. Wiss. Wien*, liii. 1866, p. 479, taf. 6. f. 5 (young).
—— henlei, *Steindachner, l. c.* fig. 4 (half-grown).
—— australis, *Steindachner, l. c.* p. 480, taf. 7.

Disk rather broader than long, the anterior margins meeting at a very obtuse angle; snout not projecting. Skin entirely smooth. Tail shorter than the disk in adult examples, rather longer in immature. Nasal valve fringed; six short papillæ at the bottom of the mouth. Coloration uniform.

Australian seas.

a, *b*, *c–d*. Adult and half-grown. Sydney.
e. Half-grown. Cape Upstart. Presented by J. B. Jukes, Esq.
f–g. Half-grown. New Holland. From the Haslar Collection.

5. Urolophus javanicus.

Trygonoptera javanica, *Martens, Monatsber. Ak. Wiss. Berlin*, 1864, p. 260.

Allied to the Australian species. The body is a little longer than broad, and the upper surface is mottled with lighter and darker spots. The number of papillæ at the bottom of the mouth is thirteen.

Batavia.

20. PTEROPLATEA

Pteroplatea *et* Aëtoplatea, *Müll. & Henle.*

Body at least twice as broad as long; tail very short and thin, without or with a rudimentary fin, and with a serrated spine. Pectorals united in front. Nasal valves coalescent into a quadrangular flap. No papillæ at the bottom of the mouth. Teeth very small, uni- or tricuspid.

Temperate and tropical seas.

α. *Tail without fin*: Pteroplatea *.

1. Pteroplatea altavela.

Pastinaca marina &c., *Columna, Aquat. et Terrestr. anim. observ.* pp. iv, ii; *Willughby*, p. 65, tab. C 1. fig. 3.
Raja pastinaca, var. altavela, *L. Syst. Nat.* i. p. 396.
—— altavela, *L. Gm.* i. p. 1509.
Trygon altavela, *Bonap. Faun. Ital. Pesce.*
Pteroplatea altavela, *Müll. & Henle*, p. 168; *Duméril, Elasmobr.* p. 611.
—— canariensis, *Valenc. in Webb & Berth. Iles Canar. Poiss.* p. 100, pl. 23. fig. 1; *Duméril, l. c.* p. 611.
—— valenciennii, *Duméril, l. c.* p. 612.

A tentacle behind the spiracle. Tail not quite half as long as the disk, with a narrow cutaneous fold above and below.

Mediterranean and Atlantic.

---

* 1. Pteroplatea crebripunctata, *Peters, Monats. Ak. Wiss. Berl.* 1869, p. 703.—Mazatlan.

a. Adult male, 3½ feet broad. Madeira. Presented by J. Y. Johnson, Esq.
b. Young male. Brazil. From Prof. Kölliker's Collection.

2. Pteroplatea hirundo.

Pteroplatea hirundo, *Lowe, Proc. Zool. Soc.* 1843, p. 94.
—— japonica, *Schleg. Faun. Japon. Poiss.* p. 309, pl. 141; *Bleek. Act. Soc. Sc. Indo-Neerl.* ii. *Japan*, iv. p. 45.
? Pteroplatea marmorata, *Cooper, Proc. Calif. Acad. Nat. Sc.* iii. p. 112, fig. 25.

Disk more than twice as broad as long. Spiracle without tentacle. Tail only half as long as the disk, with an indistinct cutaneous fold below, and with alternate whitish and black rings.

China, Japan, and Madeira; ? California.

a, *b–d*. Half-grown and young. Japan. Purchased of Mr. Jamrach.
e–f. Fœtus. Japan.
g. Fœtus. China. Presented by J. R. Reeves, Esq.

3. Pteroplatea maclura.

Raja maclura, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 41.
Pastinaca maclura, *Dekay, New York Faun. Fish.* p. 375, pl. 65. fig. 213.
Pteroplatea maclura, *Müll. & Henle*, p. 169; *Duméril, Elasmobr.* p. 614.

Disk not more than twice as broad as long. Spiracle without tentacle. Length of the tail less than one-half of that of the disk; it has an indistinct cutaneous fold below, and is semiannulated with black.

Western Atlantic.

a. Half-grown. Brazil. Purchased of Hr. Brandt.
b. Young. Texas. Purchased of Hr. Brandt.

4. Pteroplatea micrura.

Raja micrura, *Bl. Schn.* p. 360.
—— pœcilura, *Shaw, Gen. Zool.* v. 2. p. 291; *Russell, Fish. Corom.* pl. 6.
Pastinaca kunsul, *Cuv. Règne An.*
Trygon pœcilurus, *Benn. in Life of Raffles*, p. 694.
Pteroplatea micrura, *Müll. & Henle*, p. 169; *Cant. Mal. Fish.* p. 427; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 76; *Blyth, Journ. As. Soc. Beng.* 1860, p. 37; *Duméril, Elasmobr.* p. 613; *Day, Fish. Malab.* p. 278.

Spiracle without tentacle. Tail rather longer than the disk in half-grown examples, but rather shorter in very young, without cutaneous folds. Tail with alternate white and brown rings.

East-Indian seas.

a. Half-grown: stuffed. Calcutta.
b–c. Half-grown and young: skins. Pinang. From Dr. Cantor's Collection.
d. Young. Pinang. From Dr. Cantor's Collection.

e, *f*. Half-grown and young. Singapore.
g. Half-grown. East-Indian archipelago. From Dr. Bleeker's Collection.
h. Half-grown: stuffed. India. Presented by T. E. J. Boileau, Esq.
i. Half-grown. Presented by the Zoological Society.
k. Fœtus. From the Haslar Collection.

β. *A rudimentary fin in front of the caudal spine*: Aëtoplatea.

5. **Pteroplatea tentaculata.**

Aëtoplatea tentaculata, *Müll. & Henle*, p. 175; *Duméril, Elasmobr.* p. 630.

A tentacle behind the spiracle. Tail scarcely half as long as the body, with an upper and lower ridge. Brownish, with scattered round light spots.

Red Sea; Indian Ocean.

6. **Pteroplatea zonura.**

Aëtoplatea zonurus, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 79.

No tentacle behind the spiracle. Tail half as long as the body, with a lower cutaneous fold. Finely mottled with brown and with round whitish spots.

Batavia.

a. Type of the species. From Dr. Bleeker's Collection.

Fam. 6. MYLIOBATIDÆ.

The disk is very broad in consequence of the great development of the pectoral fins, which, however, leave the sides of the head free, and reappear at the extremity of the snout as a pair of detached (cephalic) fins.

Group A. MYLIOBATINA.

21. MYLIOBATIS*.

Myliobatis, *Cuv. Règne Anim.*

Head free from the disk; snout with a soft appendage in front, supported interiorly by fin-rays. Nasal valves coalescent into a quadrangular flap. Teeth hexangular, large, flat, tessellated; those in the middle much broader than long; several narrower series on each side. Tail very long and thin, with a dorsal fin near its root; generally a serrated spine behind the fin.

---

* 1. Myliobatis bispinosus, *Storer, Proc. Bost. Soc. Nat. Hist.* 1841, i. p. 53, and *Bost. Journ. Nat. Hist.* iv. p. 187; *Ayres, ibid.* p. 290, pl. 13. fig. 1; Myliobatis acuta, *Ayres, Proc. Bost. Soc. Nat. Hist.* i. p. 65; *Storer, Mem. Am. Acad.* ix. 1867, p. 245, pl. 39. fig. 4.—Long Island.
2. —— freminvillii, *Lesueur, Journ. Ac. Nat. Sc. Philad.* iv. p. 111.

Temperate and tropical seas.

The dentition of the species of this genus undergoes great changes with age. There is no median series of larger teeth in very young examples, but all the teeth are of equal size and regularly hexangular. The tail is much longer in young examples than in old ones, and the coloration more ornamental. Singularly enough, the serrated caudal spine is frequently absent.

1. **Myliobatis aquila.**

Aquila marina, *Bellon. De Aquat.* pp. 96, 97; *Salvian.* p. 146; *Jonston. De Pisc.* pl. 9. fig. 9; *Willughby,* p. 64, tab. C 2.
Pastinacæ, species 2da, *Rondel.* p. 338.
Aquilone, *Columna, Aquat. et Terrestr. anim. observat.* pp. i, ii.
Raja, sp. no. 5, *Artedi, Gen.* p. 72; *Synon.* p. 100.
Raja aquila, *L. Syst. Nat.* i. p. 396; *Brünn. Pisc. Mass.* p. 3; *Bloch,* taf. 81; *Bl. Schn.* p. 360; *Risso, Ichth. Nice,* p. 9.
Duhamel, Pesch. iii. sect. ix. p. 283, pl. 10.
Whip-Ray, *Penn. Brit. Zool.* iii. p. 88, and edit. 1862, iii. p. 128; *Jenyns, Man.* p. 519.
Myliobatis aquila, *Cuv. Règne An.*; *Risso, Eur. Mérid.* iii. p. 162; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 591, or, 3rd edit. ii. p. 595; *Müll. & Henle,* p. 176; *Couch, Fish. Brit. Isl.* i. 135, pl. 32; *Duméril, Elasmobr.* p. 634.
Pastinaca aquila, *Gronov. Syst.* ed. *Gray,* p. 12.

Body entirely smooth. The skinny prolongation of the snout is obtuse, and but moderately produced. Median teeth of the upper jaw from four to six times as broad as long. The insertion of the dorsal fin is behind or opposite the extremity of the ventral fins. Orbit with scarcely a trace of a projection above. Coloration uniform.

Mediterranean, Atlantic, Australian seas.

a. Adult female: stuffed. England. From Mr. Yarrell's Collection.
b. Half-grown female: stuffed. Berwick. From Mr. Yarrell's Collection.
c. Adult male. Madeira. Presented by J. Y. Johnson, Esq.
d. Adult female: stuffed.
e. Adult male: stuffed.
f. Half-grown.

The following specimens have narrower teeth, those in the upper jaw being only twice as wide as long. They are very young examples, and therefore this may be only a difference due to age.

g, h. Young. Sydney.
i. Young: stuffed. Presented by G. Rose, Esq.

---

3. Rhinoptera vespertilio, *Girard, Proc. Ac. Nat. Sc. Philad.* 1856, p. 137, and *Bost. Journ. Nat. Hist.* 1857, p. 544, pl. 26, or *U. S. Pac. R.R. Exped. Fish.* p. 375; Holorhinus vespertilio, *Gill, Proc. Ac. Nat. Sc. Philad.* 1862, p. 331; Myliobatis californicus, *Gill, Ann. Lyc. Nat. Hist. New York,* viii. p. 137.—California.

2. Myliobatis cornuta.

Myliobatis aquila, *Schleg. Faun. Japon. Poiss.* p. 310, pl. 142.
? Myliobatis tobijei, *Bleek. Verh. Bat. Gen.* xxvi. *N. Nalez. Japan,* p. 130.

The length of the disk is nearly two-thirds of its width. Median line of the back without tubercles. A short conical horn above each orbit. Snout rather produced. The median teeth of the upper jaw five or six times as broad as long. The dorsal fin commences at some distance behind the extremity of the ventrals. Coloration uniform.

Japan.

a. Male. Purchased of Mr. Jamrach.—Length of disk 11 inches, breadth of disk 18 inches, distance of the eyebrows $3\frac{1}{8}$ inches, length of the snout $1\frac{5}{8}$ inch.

3. Myliobatis vespertilio.

Myliobatis milvus, *Cant. Mal. Fish.* p. 433 (not synon.).
—— vespertilio, *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 85.

Disk at least twice as broad as long. Median line of the back without tubercles. Snout somewhat produced. The dorsal fin commences close to the extremity of the ventrals, beyond which it does not extend. Orbit without horn. On the head and back a number of distant anastomosing black lines, which on the anterior half of the root of the pectorals are arranged transversely. On the rest of the body the black lines form an open network.

East-Indian archipelago.

4. Myliobatis maculata.

Gray, Illustr. Ind. Zool.; *Müll. & Henle,* p. 178; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 84.

A band of small tubercles along the median line of the scapulary region. Snout with the fleshy protuberance of moderate length, obtuse. The dorsal fin stands between the ventrals, its origin being conspicuously behind the end of the root of the ventrals. Orbit without horn. Posterior half of the disk with brown-edged ocelli. [No caudal spine.]

Indian seas.

a. Young. East-Indian archipelago. From Dr. Bleeker's Collection.
b. Young: stuffed. India. Purchased of Mr. Argent.

5. Myliobatis bovina.

Myliobatis aquila, *Bonap. Faun. Ital. Pesc.*; *Lowe, Fish. Madeira,* pl. 15.
—— bovina, *Geoffr. St.-Hil. Descr. Eg. Poiss.* p. 323, pl. 26. fig. 1.
—— episcopus, *Valenc. in Webb & Berthel. Iles Canar. Ichthyol.* p. 98, pl. 24.
—— bonapartii, *Duméril, Elasmobr.* p. 635.

Body smooth in young examples, rather rough in old ones. Snout produced into a long and somewhat pointed fleshy appendage. Median teeth of the upper jaw about eight times as broad as long in adult examples, but they are comparatively broader in young ones. Dorsal fin between the ventrals, its origin being at a very short distance behind the insertion of the ventrals. Orbit without horn. Coloration uniform.

Mediterranean and neighbouring parts of the Atlantic.

a. Head and part of body of an adult example. Madeira. From the Collection of the Rev. R. T. Lowe.
b. Half-grown. Madeira. From the Collection of the Zoological Society.
c. Young: stuffed. Madeira. Presented by the Rev. R. T. Lowe.

6. Myliobatis nieuhofii.

Zee-vleermuis, *Nieuhof, Lant en Zee-Reize*, ii. p. 278, with fig.; *Willughby, App.* p. 6, tab. 10. fig. 3; *Russell, Fish. Corom.* pl. 10.
Raja nieuhofii, *Bl. Schn.* p. 364.
—— fasciata, *Shaw, Gen. Zool.* v. 2. p. 286, pl. 143.
Myliobatis nieuhofii, *Cuv. Règne An.*; *Müll. & Henle*, p. 177; *Cantor, Mal. Fish.* p. 432; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 85; *Duméril, Elasmobr.* p. 638.

Body smooth. The fleshy protuberance of the snout is very short and obtuse. Disk twice as broad as long. The origin of the dorsal fin is nearly opposite to the end of the root of the ventrals. Orbit without horn. Young individuals with about five blue cross bands, which disappear with age. No spots. [In none of the specimens have I observed a caudal spine.]

Indian Ocean and archipelago; Japan.

a. Young: stuffed. Pinang. From Dr. Cantor's Collection.
b, c. Half-grown and young. Moluccas.
d. Half-grown. Japan. Purchased of Mr. Jamrach.

7. Myliobatis milvus.

Myliobatis milvus, *Müll. & Henle*, p. 178; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 87; *Duméril, Elasmobr.* p. 638.
—— vultur, *Müll. & Henle*, p. 179; *Duméril, l. c.* p. 640.
—— oculeus, *Richards. Ichth. Chin.* p. 198.

Body smooth. The fleshy protuberance of the snout is very short and obtuse. Disk not twice as broad as long. The origin of the dorsal fin is nearly opposite to the end of the root of the ventrals. Orbit without horn. Posterior half of the body with green ocelli, edged with brown. [No caudal spine.]

East-Indian seas; China.

a. Young. China. Presented by J. R. Reeves, Esq.—Type of *M. vultur*.
b. Young. East-Indian archipelago. From Dr. Bleeker's Collection.

Only young examples have been examined of this species, which appears to be distinguished from *M. nieuhofii* by a less broad disk. The narrowness of the teeth, length of the tail, and probably also the coloration are signs of the immature state of the examples examined, but not specific characters.

22. AËTOBATIS.

Aëtobatis, *Müll. & Henle.*
Stoasodon, *Cantor.*

Form of the head, body, and tail as in *Myliobatis*. The nasal valves remain separate, each forming a long flap. The lower dental lamina projects beyond the upper. Teeth flat, broad, forming a single series, equivalent to the median series of *Myliobatis*, there being no small lateral teeth.

Tropical seas.

1. Aëtobatis narinari.

Narinari, *Marcgr.* pp. 175, 176; *Willughby*, p. 66, tab. C 1. fig. 5.
Raja narinari, *Euphrasen, Vet. Ak. nya Handl.* 1790, xi. p. 217; *Bl. Schn.* p. 361.
—— flagellum, *Bl. Schn.* p. 361, tab. 73.
Russell, Fish. Corom. i. tab. 8.
Raja guttata, *Shaw, Gen. Zool.* v. 2. p. 285, pl. 142.
Myliobatis narinari, *Cuv. Règne An.*; *Ben. in Life of Raffles*, p. 694; *Agass. Poiss. Foss.* iii. pl. D.
Raja quinqueaculeata, *Quoy & Gaim. Voy. Uran.* p. 200, pl. 43. fig. 3.
Aëtobatis narinari, *Müll. & Henle*, p. 179; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 87; *Duméril, Elasmobr.* p. 641; *Day, Fish. Malab.* p. 280.
—— flagellum, *Müll. & Henle*, p. 180; *Blyth, Journ. As. Soc. Beng.* 1860, p. 37; *Duméril, l. c.* p. 642.
Myliobatis eeltenkee, *Rüpp. N. W. Fisch.* p. 70, taf. 19. fig. 3 (teeth).
Goniobatis flagellum, *Agass. Proc. Bost. Soc. Nat. Hist.* vi. p. 385.
—— macroptera, *M'Clell. Calc. Journ. Nat. Hist.* 1841, i. p. 60, pl. 2. fig. 1.
Stoasodon narinari, *Cant. Mal. Fish.* p. 434.
Aëtobatis latirostris, *Duméril, Arch. Mus.* x. p. 242, pl. 20, or *Elasmobr.* p. 643; *Günth. Trans. Zool. Soc.* 1868, p. 491.
—— laticeps, *Gill, Ann. Lyc. Nat. Hist. New York*, viii. p. 137.

Body smooth. Dorsal fin situated between the ventrals. Disk generally with numerous round bluish-white spots.

The teeth of the lower jaw are sometimes angularly bent, sometimes nearly straight. Our series of examples shows clearly that this difference is individual and does not constitute a specific character.

Tropical seas.

a. Half-grown female: skin. Jamaica. Purchased of Mr. Parnell.
b. Adult female: skin. Bahia. Purchased of M. Parzudaki.
c. Half-grown. Bay of Panama. From the Collection of Messrs. Dow and Salvin.
d. Young: skin. Pinang. From Dr. Cantor's Collection.

e. Adult. Sumatra. From the Collection of Sir S. Raffles.
f. Half-grown: stuffed. India. Presented by T. C. Jerdon, Esq.
g. Half-grown. Seychelles. Presented by Lieut.-Col. Playfair.—Lower teeth angularly bent.
h. Half-grown. Seychelles. From the Collection of Prof. Perceval Wright.—Lower teeth nearly straight; otherwise perfectly identical with the preceding specimen.
i. Half-grown. From the Collection of the Zoological Society.
k. Adult: stuffed.
l. Tail of a very large example, with four spines.
m. Tail of a very large example, with five spines. Seychelles. Presented by S. Ward, Esq.
n. Jaws of a very large example. Seychelles. Presented by S. Ward, Esq.
o–p. Dental laminæ.

23. RHINOPTERA*.

Rhinoptera, *Kuhl*.
Rhinoptera, Mylorhina *et* Micromesus, *Gill, Ann. Lyc. Nat. Hist. New York*, viii. p. 136.

Head free from the pectoral fin, but provided with a pair of rayed appendages situated at the lower side of the snout. Nasal valves confluent into a broad flap with free margin. Teeth broad, flat, tessellated, in five or more series, the middle being the broadest, and the others decreasing in width outwards. Tail very slender, with a dorsal fin before the serrated spine.

Tropical and subtropical seas.

1. Rhinoptera marginata.

Rhinoptera marginata, *Cuv. Règne An.*; *Müll. & Henle*, p. 181; *Duméril, Elasmobr.* p. 645.
Myliobatis marginata, *Geoffr. St.-Hilaire, Descr. Eg. Poiss.* p. 220, pl. 25. figs. 3 & 4.

Nine rows of teeth in each jaw, those of the middle series thrice as broad as long. The dorsal fin commences above the end of the root of the ventrals. Tail not quite twice as long as the body.

Mediterranean.

a. From Prof. Kölliker's Collection.

2. Rhinoptera jussieui.

Jussieu, Mém. Ac. Sc. 1723, p. 75, pl. 4. fig. 12; *Owen, Odontogr.* pl. 25. fig. 2.
Myliobatis jussieui, *Cuv. Règne An.*
Rhinoptera brasiliensis, *Müll. Abhandl. Ak. Wiss. Berl.* 1836, p. 237, pl. 9. fig. 12; *Müll. & Henle*, p. 182; *Duméril, Elasmobr.* p. 646.
Zygobatis jussieui, *Agass. Poiss. Foss.* iii. pp. 79, 328, pl. D. fig. 8.

Nine rows of teeth in each jaw, those of the middle series being six times as long as broad, and those of the adjoining series rather more than thrice. The middle teeth of the lower jaw narrower than those of the upper. Tail more than twice as long as the disk.

---

* 1. Rhinoptera peli, *Bleek. Nat. Verh. Holl. Maatsch. Wet. Haarlem.* 1863, *Guinée*, p. 18, tab. 1.—West Africa.

Brazil.

3. Rhinoptera lalandii.

Müll. & Henle, p. 182; *Duméril, Elasmobr.* p. 645.

Dentition of the upper jaw different from that of the lower. Five or seven series in the upper jaw, the teeth of the middle series being six times as broad as long, and those of the next following series about twice as broad as long. Lower jaw with seven series, the teeth of the middle series being four times as broad as long. Tail nearly twice as long as the disk.

Brazil.

a. Young: stuffed. Purchased.

4. Rhinoptera javanica.

Monro, Phys. Fisch. taf. 34. figs. 2–4 (teeth).

Rhinoptera javanica, *Müll. & Henle*, p. 182, taf. 58; *Bleek. Verh. Bat. Gen.* xxiv. *Plag.* p. 89; *Duméril, Elasmobr.* p. 647.

—— affinis, *Bleek. Nat. Verh. Holl. Maatsch. Wet. Haarlem*, 1863, *Guinée*, p. 19 (fœtus).

Disk not twice as broad as long. Median notch of the snout shallow. Seven series of teeth in each jaw, those of the middle upper series about four times as broad as long, and not quite twice as broad as the next adjoining teeth. Lower teeth rather narrower than the upper. Tail not twice as long as the disk.

East Indies.

a. Fœtus. Java. From Dr. Bleeker's Collection.—Type of *Rh. affinis*.

b, *c*. Upper jaws of adult examples.

A large example, obtained by the Antarctic Expedition, without teeth, and generally in very bad condition, has been named *Rh. smithii* by Dr. Gray. It probably belongs to this species.

5. Rhinoptera quadriloba.

Raja bonasus, *Mitch. Trans. Lit. & Phil. Soc. New York*, i. 1815, p. 479 (no descr.).

—— quadriloba, *Lesueur, Journ. Ac. Nat. Sc. Philad.* i. p. 44.

Rhinoptera quadriloba, *Cuv. Règne An.*; *Dekay, New York Faun. Fish.* p. 375, pl. 66. fig. 217; *Duméril, Elasmobr.* p. 648.

Disk more than twice as broad as long. Median notch of the snout deep. Seven series of teeth in each jaw, those of the middle upper series about four times as broad as long. Tail a little longer than the disk.

Atlantic coasts of the United States.

6. Rhinoptera adspersa.

Müll. & Henle, p. 183; *Duméril, Elasmobr.* p. 648.

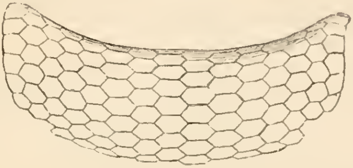
Upper surface covered with minute stellate asperities. Teeth in nine series in the upper jaw, and in seven in the lower, those of the middle upper series being thrice as broad as long, but narrower than those of the adjoining series.

East Indies.

?*a*. Young: stuffed, not in good state. From the Collection of the East-India Company.

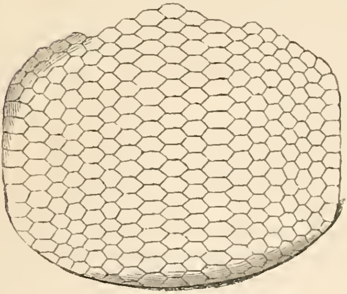
7. Rhinoptera polyodon.

Upper jaw.



Front.

Front.



Lower jaw.

Upper jaw with fifteen series of hexangular teeth, those of the five middle series being but little broader than those of the outer ones. Lower jaw with nineteen series of similar teeth, those of the five middle and of the outermost series being nearly twice as broad as the others.

Hab. —— ?

a. Jaws.

Group B. CERATOPTERINA.

24. DICEROBATIS.

Cephaloptera, *Duméril* (preoccupied).
Dicerobatis, *Blainville*.
Cephaloptera *et* Mobula, *Aug. Duméril, Elasmobr.* p. 650.

Head free from the pectoral fin, truncated in front, on each side with a straight horn-like appendage pointing forwards, which is a cephalic portion of the pectoral fin. Nostrils widely separate from each other. Mouth inferior, wide. Teeth in both jaws very small, flat, or tubercular, in numerous series. Tail very slender, with a dorsal fin between the ventrals, and with or without a serrated spine.

Temperate and tropical seas.

These fishes, as well as those of the following genus, are frequently called *Sea-devils*, and attain to an enormous size.

1. Dicerobatis giornæ.

Squalus edentulus, *Brünn. Pisc. Mass.* p. 6.
Giorna, Mem. Ac. Sc. Turin, ii. 1805, p. 4.
Raja giorna, *Lacép.* v. p. 666; *Jenyns, Man.* p. 519.
—— fabroniana, *Lacép.* ii. p. 111, pl. 5.
Aodon cornu, *Lacép.* i. p. 300.
Cephaloptera giorna, *Cuv. Règne An.*; *Risso, Ichth. Nice*, p. 14; *Eur. Mérid.* iii. p. 163, pl. 5; *Müll. & Henle*, p. 184; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 595, or, 3rd edit. ii. p. 600; *Valenc. in Webb & Berthel. Iles Canar.* p. 97, pl. 22; *Duméril, Elasmobr.* p. 653.
—— massena, *Risso, Ichth. Nice*, p. 15, and *Eur. Mérid.* iii. p. 164; *Duméril, l. c.* p. 654.
? Mobular, *Duhamel, Pesches*, iii. sect. ix. p. 293, pl. 17.
? Raja cephaloptera, *Bl. Schn.* p. 365.
? Dicerobatis mobular, *Blainv. Faune Franc.* p. 41.
? Raja diabolus, *Shaw, Zool.* v. 2. p. 291.
Cephaloptera, *Thomps. Proc. Zool. Soc.* 1835, p. 78; *M'Coy, Ann. & Mag. Nat. Hist.* 1847, xix. p. 176, pl. 11.
Ox-Ray, *Couch, Fish. Brit. Isl.* i. p. 139, pl. 33.
Cephaloptera fabroniana, *Duméril, Elasmobr.* p. 658.

Teeth minute, in more than 150 series extending nearly to the angles of the mouth; those of the middle have a rounded shape. Back smooth, with minute scales behind. Tail with more or less numerous tubercles, and with a spine.

Mediterranean and coasts of Europe.

a. Fine female example, 5 feet broad. Algiers. Presented by Lieut.-Col. Playfair.

2. Dicerobatis japonica.

Cephaloptera japonica, *Müll. & Henle, Plag.* p. 185; *Schleg. Faun. Japon. Poiss.* p. 310.

Teeth very minute, obtuse tubercles, extending laterally to the angles of the mouth. Tail nearly thrice as long as the body. Back rough; tail with a series of small white tubercles on each side. (*M. & H.*)

Japan.

3. Dicerobatis eregoodoo.

Eregoodoo tenkee, *Russell*, p. 5, pl. 9.
Dicerobatis eregoodoo, *Cant. Mal. Fish.* p. 438.
Cephaloptera eregoodoo, *Duméril, Elasmobr.* p. 655.

Teeth imbricate, those of the upper jaw in from 80 to 90 series; each tooth about twice as broad as long, with one or two points behind. The band of teeth terminates laterally at a short distance from the angles of the mouth. Body and tail smooth. Tail without spine.

Indian Seas.

a. Stuffed, 34 inches broad. Presented by T. C. Jerdon, Esq.

4. Dicerobatis kuhlii.

?? Raja manatia, *Lacép.* i. p. 160, pl. 7. fig. 2.
?? —— banksiana, *Lacép.* ii. p. 115, pl. 5. fig. 3.
Cephaloptera kuhlii, *Müll. & Henle*, p. 185, taf. 59. fig. 1; *Bleek. Act. Soc. Sc. Indo-Neerl.* iii. *Amboina*, ix. p. 6; *Duméril, Elasmobr.* p. 654.

Teeth tessellated, those of the upper jaw in about 34 series, each tooth being much broader than long, and slightly crenulated behind. The band of teeth terminates laterally at some distance from the angles of the mouth. Body and tail smooth. Tail scarcely as long as the disk, without spine.

Indian Ocean and archipelago.

a. Half-grown: stuffed. From the Collection of the Zoological Society.—Type of the species.
b. Young. Zanzibar. From Lieut.-Col. Playfair's Collection.

5. Dicerobatis olfersii.

? Cephalopterus hypostomus, *Bancroft, Proc. Comm. Zool. Soc.* 1830, p. 134, or *Zool. Journ.* v. p. 409, pl. L.
Cephaloptera olfersii, *Müll. Abhandl. Ak. Wiss. Berl.* 1834, p. 311; *Müll. & Henle*, p. 185; *Duméril, Elasmobr.* p. 657.

Teeth tessellate, those of the upper jaw in about 40 oblique series; they are scarcely broader than long, subtriangular, with the point directed backwards. The band of teeth reaches only to the middle of each of the lateral halves of the jaw. The middle of the back with extremely minute tubercles.

Brazil.

25. CERATOPTERA.

Ceratoptera, *Müll. & Henle.*

Head free from the pectoral fin, truncated in front, on each side with a horn-like appendage pointing forward or inward, which is a cephalic portion of the pectoral fin. Mouth anterior, wide. Teeth in the lower jaw only, very small. Tail very slender, with a dorsal fin between the ventrals, and without spine.

Tropical and temperate seas.

1. Ceratoptera vampyrus.

? Zee Duyvel, *Nieuhof, Lant- en Zee-Reize*, ii. p. 275; *Willughby*, p. 5, tab. 9. fig. 3; *Petiver, Gazophyl.* i. tab. 54. fig. 2.
? Raja fimbriata, *Lacép.* iv. p. 677, pl. 16. fig. 3.
Cephalopterus vampyrus, *Mitch. Ann. Lyc. Nat. Hist. New York*, 1823, i. p. 23, pl. 2. fig. 1 (cop. in *Isis*, 1832, p. 1063, taf. 28. fig. 4); *Dekay, New York Faun. Fish.* p. 377, pl. 67. fig. 219.
—— giorna, *Lesueur, Journ. Ac. Nat. Sc. Philad.* iv. p. 115, pl. 6.
Sea-Devil, *Lamont, Edinb. Philos. Journ.* 1824, xi. p. 113.
Cephaloptera manta, *Bancroft, Zool. Journ.* iv. p. 444 (Manta americana).
—— diabolus, *Valenc. in Cuv. Règne An. illustr. Poiss.* pl. 119.
—— johnii, *Müll. & Henle*, p. 660, taf. 59.
Diabolichthys elliotti, *Holmes, Proc. Elliott Soc. Nat. Hist. Charlest.* 1856, p. 39.
Ceratoptera vampirus, *Duméril, Elasmobr.* p. 660.

The teeth extend over the whole width of the lower jaw; they are arranged in about 100 longitudinal rows, the rows being separated from one another by distinct interspaces. Tail about as long as the body. The whole body and tail rough, equally covered with small tubercular prominences.

Atlantic. Attains to a width of about twenty feet.

a. Stuffed, 5 feet broad. Jamaica. Purchased of the United Service Museum.

This example was a fœtus taken from the uterus of the mother, captured by Lieut. St. John. She measured 15 feet in width as well as in length, and was between 3 and 4 feet thick. The fœtus weighed 20 pounds.

2. Ceratoptera ehrenbergii.

Müll. & Henle, p. 187*.

The teeth do not extend over the whole width of the lower jaw, and are arranged in about 200 series, which stand close together. Tail about as long as the body. The whole body and tail rough, covered with small tubercles with a stellate base.

Red Sea.

---

* On an unpublished plate of the 'Symbolæ Physicæ' this species is named "Cephaloptera stelligera;" the horns are horizontally bent inwards.

Subclass V. CYCLOSTOMATA.

Skeleton cartilaginous and notochordal, without ribs, and without real jaws. Skull not separate from the vertebral column. No limbs. Gills in the form of fixed sacs, without branchial arches, six or seven in number on each side. One nasal aperture only. Heart without bulbus arteriosus. Mouth anterior, surrounded by a circular or subcircular lip, suctorial. Alimentary canal straight, simple, without cæcal appendages, pancreas, or spleen. Generative outlet peritoneal. Vertical fins rayed.

Cfr. Müller, Abhandl. Ak. Wiss. Berlin, 1834, p. 76.—These fishes were named *Marsipobranchii* by Bonaparte, and form one of the two suborders of the Subclass *Dermopteri* of Owen (Anat. Vert. i. p. 7). Müller has divided them into two families:—

I. **Petromyzontidæ.** The nasal duct terminates blind, not penetrating the palate (p. 499).

II. **Myxinidæ.** The nasal duct penetrates the palate (p. 510).

Fam. 1. PETROMYZONTIDÆ.

Cyclostomata hyperoartia, *Müller, Abhandl. Ak. Wiss. Berl.* 1834, p. 77.

Body eel-shaped, naked. Subject to a metamorphosis. In the perfect stage with a suctorial mouth armed with teeth simple or multicuspid, horny, sitting on a soft papilla. Maxillary, mandibulary, lingual, and suctorial teeth may be distinguished. Eyes present (in mature animals). External nasal aperture in the middle of the upperside of the head. The nasal duct terminates without perforating the palate. Seven branchial sacs and apertures on each side behind the head. The inner branchial ducts terminate in a separate common tube. Intestine with a spiral valve. Eggs small.

The *larvæ* without teeth and with a single continuous vertical fin.

Lampreys. Inhabitants of the fresh waters and coasts of the temperate regions of both hemispheres. Suck themselves fast to other fish, and feed by scraping off their flesh.

Synopsis of the Genera.

A. The second dorsal fin continuous with the caudal.
  Maxillary tooth bicuspid................ 1. *Petromyzon*, p. 500.
  Maxillary tooth tricuspid .... 2. *Ichthyomyzon*, p. 506.
  Two tricuspid groups of maxillary teeth .. 3. *Mordacia*, p. 507.

B. The second dorsal fin separate from the caudal.
  Maxillary lamina four-lobed .... 4. *Geotria*, p. 508.

1. PETROMYZON[*].

Petromyzon, *Artedi, Gen.* p. 64.

---

[*] 1. Petromyzon argenteus, *Kirtland, Bost. Journ. Nat. Hist.* iii. 1842, pl. 4. fig. 3.—Big Miami, Ohio.—Dorsal fin represented high and continuous, with a very shallow depression instead of the usual separation of the dorsal fins.
2. —— lamottenii, (*Lesueur*) *Dekay, Fish. New York*, p. 382, pl. 79. fig. 249.—North America.—Perhaps a small *P. marinus*.
3. —— appendix, *Dekay, l. c.* p. 381, pl 64. fig. 211.—New York.—Probably = *P. branchialis*; the anal appendage is the genital tube visible in Lamperns during the breeding-season.
4. Ammocœtes concolor, *Kirtland, Bost. Journ. Nat. Hist.* iii. p. 473, pl. 27. fig. 1.—Mahoning and Scioto Rivers.
5. —— bicolor, *Lesueur, Trans. Amer. Phil. Soc.* i. p. 386; *Dekay l. c.* p. 383, pl. 79. fig. 248.—Connecticut River.
6. —— unicolor, *Dekay, l. c.* p. 383, pl. 79. fig. 250.—Lake Champlain.
7. —— borealis, *Agassiz, Lake Super.* p. 252.—Lake Superior.
8. —— cæruleus, *Philippi, Wiegm. Arch.* 1858, p. 306.—Valdivia.
9. —— landbecki, *Philippi, l. c.* p. 307.—Valdivia.
10. Chilopterus, *Philippi, l. c.* p. 308.—Valdivia.—This supposed genus [which is evidently a larval (*Ammocœtes*) form] is characterized thus: Corpus vermiforme, cæcum. Os edentulum. Labia duo distincta, inferius formam tubi dimidiati brevis referens; superius maius, transversum, semiorbiculare, lateribus liberis involutis labrum inferius amplectens. Pinna dorsalis unica cum caudali confluens.
11. Ammocœtes æpyptera, *Abbott, Proc. Ac. Nat. Sc. Philad.* 1860, p. 327.—Ohio.
12. Petromyzon (marinus) camtschaticus, *Pall. Zoogr. Ross.-As.* iii. p 67.—Kamstschatka.

Petromyzon *et* Lampetra, *Gray, Chondropt.* p. 143.
Larva: Ammocœtes, (*Duméril*) *Cuv. Règne An.*
Larva: Scolecosoma, *Girard, U. S. Pac. R. R. Exped. Fish.* p. 384.

Dorsal fins two, the posterior continuous with the caudal. The maxillary dentition consists of two teeth placed close together, or of a transverse bicuspid ridge; lingual teeth serrated.

Coasts and fresh waters of the northern hemisphere.

Prof. Aug. Müller (Müller's Archiv, 1856, p. 325) has shown that the fishes of this genus are subject to a metamorphosis, the larval form having been hitherto known as *Ammocœtes*. He has proved the truth of his discovery by tracing the development of *Ammocœtes branchialis* into *Petromyzon planeri*. It may be assumed that not only the Petromyzons proper, but also the fishes of the allied genera undergo a similar metamorphosis.

Ammocœtes branchialis requires three or four years for its complete development. In the larval state the head is very small, and the buccal cavity is surrounded by a semicircular upper lip, the separate lower lip being very small. There are no teeth, but several fringed barbels surround the mouth. The eyes are extremely small, hidden in a shallow groove. A median single nasal opening and seven gill-openings, as in the adult. The vertical fins form a continuous fringe, in which the later divisions are more or less distinctly indicated. Species described as *Ammocœtes* and distinguished by their authors on account of modifications of the organs subject to metamorphosis, are, of course, quite inadmissible.

On the numerous publications on the anatomy of the Lampreys, consult Engelmann & Carus, Biblioth. Zoolog. pp. 1030–1031.

1. Petromyzon marinus.

The Sea-Lamprey. See-Neunauge. Lamproie. Nejonögon (*Swed.*).
Lampetra s. Mustela, *Bellon. De Aquat.* p. 76; *Rondel.* p. 398; *Willughby*, p. 105, tab. 2. fig. 2.
Lampetra maculosa, *Salvian.* f. 63 *a.*
—— major, *Salvian.* f. 63 *b*; *Aldrov.* p. 539; *Jonston. De Pisc.* tab. 24. f. 5.
Petromyzon, sp. no. 2, *Artedi, Synon.* p. 90: *Gen.* p. 64.
Petromyzon marinus, *L. Syst. Nat.* i. p. 394; *Nau, Schrift. Ges. ntrf. Freund. Berl.* vii. p. 466; *Schœpff, Schrift. Ges. ntrf. Freund. Berl.* viii. p. 184; *Bl. Fisch. Deutschl.* iii. p. 38, taf. 77; *Bl. Schn.* p. 530; *Lacép.* i. p. 3, pl. 1; *Mitch. Lit. & Phil. Trans. New York*, i. p. 461; *Donov. Brit. Fish.* pl. 81; *Flem. Brit. An.* p. 163; *Müller, Abhandl. Ak. Wiss. Berl.* 1834, p. 78; *Parnell, Fish. Firth of Forth*, p. 282; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 598, or, 3rd edit. i. p. 32; *Gray, Chondropt.* p. 138, or *Proc. Zool. Soc.* 1851, p. 235, pl. 4. fig. 1; *Nilss. Skand. Faun. Fisk.* p. 743; *Sélys-Longch. Faun. Belge*, p. 226; *Kröyer, Danm. Fisk.* iii. p. 1025; *Günth. Fisch. Neckar's*, p. 131; *Heckel & Kner, Süsswasserf.* p. 374, figs. 200 & 201; *Siebold, Süsswasserf.* p. 368; *Bert, Ann. Sc. Nat.* 1867, vii. p. 371; *Blanchard, Poiss. France*, p. 512; *Canestrini, Arch. p. la Zool.* iv. p. 184.

Lamprey, *Pennant, Brit. Zool.* iii. p. 102, pl. 10; *Couch, Fish. Brit. Isl.* iv. p. 385, pl. 247. fig. 1 *.
Petromyzon lampetra, *Pall. Zoogr. Ross.-As.* iii. p. 66.
—— americanus, *Lesueur, Trans. Am. Phil. Soc.* i. p. 383; *Dekay, New York Faun. Fish.* p. 379, pl. 66. fig. 216; *Storer, Mem. Amer. Acad.* ix. 1867, p. 251, pl. 38. fig. 4.
—— maculosus, *Gronov. Syst.* ed. *Gray*, p. 2.
Dentition: *Born, in Heusinger, Zeitschr. f. Organ. Phys.* i. 1827, pp. 183, 194, taf. 6. figs. 5 & 9.

Two pointed maxillary teeth close together; mandibulary tooth single, crescent-shaped, with from seven to nine cusps. Two pairs of lunate, pectinate lingual teeth; the teeth of the anterior pair confluent. Suctorial disk with numerous conical teeth, arranged in oblique series, those nearest to the buccal cavity being largest and partly bicuspid. First dorsal fin rather widely separated from the second. The distance of the last gill-opening from the extremity of the snout is one-fifth, or in small individuals one-fourth of the total length. Body marbled with black.

Coasts and rivers of Europe, North America, and West Africa.

a. Adult. Merrimack River. Purchased of Mr. Wright.
b, *c*. Adult. New York. Purchased of Hr. Brandt.
d. Six inches long. Nova Scotia. Presented by J. M. Jones, Esq.
e–*f*. Adult. Lough Neagh. Presented by R. Patterson, Esq.
g. Adult: stuffed. Firth of Forth. Purchased of Dr. Parnell.
h. Seven inches long. Scotland. Presented by Dr. Johnston.
i, *k*, *l*. Adult. England.
m–*n*. Adult: stuffed. England.
o. Adult. Baltic. From the Haslar Collection.
p. Adult. Holland. From the Collection of Dr. van Lidth de Jeude.
q. Adult. Lisbon. Presented by the Rev. R. T. Lowe.
r. Seven inches long. Mediterranean. Purchased of Mr. Cutter.
s. Eight inches long. West Africa. Presented by J. C. Salmon, Esq.
t. Adult. Purchased of Mr. Jamrach.

2. **Petromyzon fluviatilis.**

River Lamprey *or* Lampern; Fluss-Neunauge.
Mustella, *Auson. Mosell.* v. 107.
Mustella fluviatilis, *Bellon. De Aquat.* p. 75.
Lampetra parva *et* fluviatilis, *Rond. De Pisc. Fluv.* p. 202; *Aldrov.* p. 581; *Jonston. De Pisc.* ii. tab. 28. fig. 10; *Willughby*, p. 106, tab. G 3. fig. 2; *Marsil. Danub. Pan. Mys.* iv. p. 2, tab. 1.
Lampetra subcinerea, *Salvian.* fol. 63 *a*.
Petromyzon, sp. no. 1, *Artedi, Synon.* p. 89; *Gen.* p. 64; *Spec.* p. 99; *Gronov. Mus.* i. p. 64. no. 114, and *Zoophyl.* p. 38. no. 359; *Klein, Pisc. Miss.* ii. p 29, tab. 1. fig. 3.
Petromyzon fluviatilis, *L. Syst. Nat.* i. p. 394; *Bl. Fisch. Deutschl.* iii.

---

* The woodcut on p. 394, illustrative of the dentition, is entirely incorrect; also the figure given by Yarrell is faulty.

p. 41, taf. 78. fig. 1; *Bl. Schn.* p. 530; *Donov. Brit. Fish.* pl. 80; *Pall. Zoogr. Ross.-As.* iii. p. 66; *Ekström, Fische Mörkö*, p. 267; *Flem. Brit. An.* p. 404; *Jenyns, Man.* p. 521; *Parn. Fish. Firth of Forth*, p. 284; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 598, or, 3rd edit. i. p. 28 [*]; *Nilss. Skand. Faun. Fisk.* p. 745; *Richards. Faun. Bor.-Amer. Fish.* p. 294; *Sélys-Longchamps, Faune Belge*, p. 226; *Kröyer, Danm. Fisk.* iii. p. 1042; *Günth. Fisch. Neckar's*, p. 134; *Heckel & Kner, Süsswasserf.* p. 377, fig. 202; *Aug. Müller, in Müller's Arch.* 1856, p. 325; *Siebold, Süsswasserf.* p. 372; *Gronov. Syst.* ed. *Gray*, p. 1; *Blanchard, Poiss. France*, p. 515; *Canestrini, Arch. p. la Zool.* iv. p. 185.

Lampern, *Penn. Brit. Zool.* iii. p. 106, pl. 10; *Couch, Fish. Brit. Isl.* iv. p. 395, pl. 247. fig. 2.

Petromyzon argenteus, *Bl.* taf. 415. fig. 2; *Bl. Schn.* p. 532, tab. 102. fig. 1; *Couch, l. c.* p. 400, pl. 247. fig. 3.

—— pricka, *Lacép.* i. p. 18.

—— juræ, *MacCulloch, West. Isles*, ii. p. 186, pl. 29.

—— nigricans, *Lesueur, Trans. Am. Phil. Soc.* i. p. 385; *Storer, Mem. Amer. Ac.* ix. 1867, p. 253, pl. 39. fig. 6.

Lampetra fluviatilis, *Gray, Chondropt.* p. 140, or *Proc. Zool. Soc.* 1851, p. 237, pl. 4. fig. 2.

Petromyzon omalii, *Van Beneden, Bull. Ac. Sc. Belg.* ii. 1857, p. 549, figs. 1–3, and xx. 1865, p. 46; *Malm, Forhandl. Skand. ntrf.* 8*de möde.* Kjöbenh. 1860, p. 580.

Organ of hearing: *Owsjannikow, Mém. Ac. Sc. St. Pétersb.* viii. 1864.

Maxillary tooth single, forming a transverse ridge with a cusp at each end; mandibulary tooth single, crescent-shaped, with about seven cusps. Tongue with a broad, transverse, trenchant tooth, which is provided with a median cusp. Two or three bi- or tricuspid teeth on each side of the gullet; the other teeth of the suctorial disk are small and not numerous. First dorsal fin separated from the second by an interspace. Coloration immaculate; sides silvery.

Coasts and rivers of Europe, North America, and Japan.

a, b, c–d, e–f. Adult and half-grown. England.

g, h, i, k–l. Adult. Holland.

m–q. Adult. Belgium. Presented by Prof. van Beneden as *P. omalii*.

r. Ten inches long. North America. Purchased of M. Parzudaki.

s. Nine inches long. Russian North America. From Hr. Gruber's Collection.

I am indebted to Prof. van Beneden for the opportunity of comparing specimens of his *P. omalii* with examples of *P. fluviatilis* from Holland, England, and other countries, and have come to the conclusion that there is no specific difference between them. This may appear a matter of surprise to those who, without specimens, consult the description and figure given by Prof. van Beneden. He represents the new species as finless, but in the examples sent the fins are well developed, and of exactly the same shape and position as in *P. fluviatilis*. With regard to the dentition, *P. omalii* is represented with ten points to the mandibular lamina, and without small teeth in the circumference of the suctorial disk. This, again, is not confirmed by the examination of examples. In all of them I count seven points only, and the small suctorial teeth are as distinct as in *P. fluviatilis.* The examples of *P. omalii* are generally a little stouter in general habit than large and full-grown individuals of *P. fluviatilis*; but this is not a specific character, as the individuals, not only of this species but also of *P. marinus*, vary very much in this respect.

---

[*] Figure of dentition incorrect.

Petromyzon japonicus, Martens, Wiegm. Arch. xxxiv. p. 3, does not appear to me to be specifically distinct from *P. fluviatilis.* The dentition in both is extremely similar, only the Japanese example has an additional transverse series of small teeth behind the mandibulary tooth. The figure accompanying the description of *P. japonicus* is incorrect, and I am indebted to Prof. Peters for reexamination of the typical specimen.

3. Petromyzon branchialis.

Pride, Sand-piper. Small Lamprey.

a. Ammocœtes-form.

Lamproyon *ou* Lamprillon, *Rondel. De Pisc. Fluv.* p. 202.
Lampetra cæca, *Willughby*, p. 107, tab. G 3. fig. 1.
Petromyzon, no. 3, *Artedi, Synon.* p. 90, and *Gen.* p. 64; *Gronov. Zoophyl.* p. 38. no. 360.
Petromyzon branchialis, *L. Syst. Nat.* i. p. 394; *Bl. Fisch. Deutschl.* iii. p. 45, taf. 78. fig. 2; *Bl. Schn.* p. 532; *Lacép.* i. p. 26, pl. 2. fig. 1; *Turt. Brit. Faun.* p. 110; *Gronov. Syst.* ed. *Gray*, p. 2.
Pride, *Penn. Brit. Zool.* iii. p. 71, pl. 8, or, ed. 1812, iii. p. 107, pl. 10.
Petromyzon ruber, *Lacép.* ii. p. 99, pl. 1.
—— lumbricalis, *Pall. Zoogr. Ross.-As.* iii. p. 69.
—— cæcus, *Couch, in Loud. Mag. Nat. Hist.* v. p. 23, fig. 10.
Ammocœtes branchialis, (*Duméril*) *Cuv. Règne An.*; *Nilss. Skand. Faun. Fisk.* p. 748; *Flem. Brit. An.* p. 164; *Jenyns, Man.* p. 522; *Parnell, Fish. Firth of Forth*, p. 287; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 609; *Sélys-Longchamps, Faune Belge*, p. 227; *Kröyer, Danm. Fisk.* iii. p. 1060; *Günth. Fisch. Neckar's*, p. 135; *Heckel & Kner, Süsswasserf.* p. 382, fig. 204; *Gray, Chondropt.* p. 145.
Mud-Lamprey, *Couch, Fish. Brit. Isl.* i. p. 404, pl. 248. fig. 2.

β. Mature form.

Petromyzon planeri, *Bl. Fisch. Deutschl* iii. p. 47 [taf. 78. fig. 3?]; *Bl. Schn.* p. 531; *Lacép.* i. p. 30, pl. 3. fig. 1; *Osbeck, Vet. Akad. Handl.* 1804, p. 181; *Blainv. Faune Franç.* ii. p. 8, pl. 1. fig. 3; *Jenyns, Man.* p. 522; *Yarrell, Brit. Fish.* 2nd edit. ii. p. 607, or, 3rd edit. i. p. 19; *Parnell, Werner. Mem.* vii. p. 446; *Nilss. Skand. Faun. Fisk.* p. 747; *Sélys-Longchamps, Faune Belge*, p. 226; *Kröyer, Danm. Fisk.* iii. p. 1060; *Günth. Fisch. Neckar's*, p. 135; *Heckel & Kner, Süsswasserf.* p. 382, fig. 204; *Aug. Müller, in Müller's Arch.* 1856, p. 325; *Siebold, Süsswasserf.* p. 375; *Couch, Fish. Brit. Isl.* iv. p. 402, pl. 248. fig. 1; *Blanchard, Poiss. France*, p. 517; *Canestrini, Arch. p. la Zool.* iv. p. 186.
—— niger, *Lacép.* iv. p. 667, pl. 15. fig. 2.
—— septocuille, *Lacép. l. c.* fig. 1.
—— sanguisuga, *Lacép.* ii. p. 101.

Petromyzon bicolor, *Shaw, Zool.* v. 2. p. 263.
—— plumbeus, *Shaw, l. c.*
Lampetra planeri, *Gray, Chondropt.* p. 144.
Development: *Aug. Müller, l. c.*; *Max Schultze, Die Entwicklungsgeschichte von* Petromyzon planeri. Haarlem, 1856, 4to.

Dentition as in *P. fluviatilis,* but the cusps are less prominent and more obtuse. The first and second dorsal are subcontinuous, although separated by a deep notch. Coloration immaculate.

Rivers of Europe and Western North America.

α. *Mature form.*

a–b. Stream three miles from Belfast. Presented by R. Patterson, Esq.
c. Several examples. Firth of Forth. Purchased of Dr. Parnell.
d. Many examples. Hawksfold (Sussex). Presented by O. Salvin, Esq.—Caught end of April on spawning-ground.
e. Many specimens illustrative of the metamorphosis. Berlin. From the Berlin Museum.
f–g. Tauber (Würtemberg). From the Stuttgart Collection.
h. Bavaria. Presented by Prof. v. Siebold.
i, k. Purchased.

β. *Ammocœtes-form.*

a. Tweed.
b. Eaton. From Leach's Collection.
c–f. River Enz (Würtemberg). From the Stuttgart Collection.
g. River Blau (Würtemberg). From the Stuttgart Collection.
h. Numerous examples. Bavaria. From Dr. Gemminger's Collection.
i–k. Sardinia. Presented by Prof. Bonelli.

4. Petromyzon ayresii.

Petromyzon plumbeus, *Ayres, Proc. Calif. Acad. Nat. Sc.* 1854, p. 28; *Girard, U. S. Pac. R.R. Exped. Fish.* p. 380 (not *Shaw*).

There are only two teeth: the superior (maxillary) is low in the middle, and elevated to a point at each end (as in *P. fluviatilis* and *branchialis*); the inferior (mandibulary) is serrated, having eight or nine nearly even points. The second dorsal is separated from the first by an interspace, but continuous with the caudal. Anal portion of the caudal scarcely conspicuous. Coloration uniform.

San Francisco.

Girard (*l. c.* p. 383) has described an *Ammocœtes cibarius* from Puget's Sound; it may be the larva of *P. plumbeus*; in its larval condition it cannot be distinguished from the European *A. branchialis.*

a. Numerous examples. British Columbia. Collected by the Boundary Commission.

The following species would appear to be the type of a distinct genus; but it will be better to leave its creation to an ichthyologist who will be able to characterize it from an autopsy of examples:—

Petromyzon (?) macrostomus.

Petromyzon macrostomus, *Burmeister, Anal. Mus. Buenos Aires*, pt. 5, 1868, *Act. Soc. Paleont.* p. xxxvi.

The outer of the concentric series of teeth contains the larger teeth, about twenty-four on each side. There are no teeth in the circumference of the mouth. Tongue armed with three large, pointed, curved teeth, the middle of which is only half the size of the others, all standing on the same base. Two dorsal fins separate from each other, and the second apparently separate from the caudal.

Buenos Ayres.

2. ICHTHYOMYZON.

Petromyzon, sp., *et* Ichthyomyzon*, *Girard.*

Not having seen typical examples of the species referred to this genus, I can characterize it only thus:—

Dorsal fins two, separate or continuous, and the posterior continuous with the caudal. Maxillary lamina with three cusps, the central much smaller than the lateral.

Western coasts of North America.

1. Ichthyomyzon tridentatus.

Petromyzon tridentatus, *Richards. Faun. Bor.-Amer. Fish.* p. 293.
—— ciliatus, *Ayres, Proc. Cal. Acad. Nat. Sc.* 1854, p. 44; *Girard, U. S. Pac. R.R. Exp. Fish.* p. 378.
—— lividus, *Girard, l. c.* p. 379.

"The thick obtuse lips are furnished with a circular row of small nipple-like papillæ, about fifty-six in number, each standing in the middle of little circular depressions having a raised margin, which are partly concealed by a rugose, tessellated plate, investing the inner surface of the lips, and of the same horny nature with that which forms the outside of the teeth; both are softened and peel off when the specimen is kept immersed in spirits. Four small, acute, conical teeth stand in a row across the upper part of this plate, and four larger ones occupy each of its sides, the upper and lower pairs being bicuspid, and the middle ones tricuspid: these stand on the sides of the maxillary ring, or inner orifice, and have their ends turned towards it; *the inferior margin of this orifice is armed with a slightly curved dental piece, having five acute points or teeth [the outer being larger than the three middle], and opposite to it, on the upperside of the orifice, is another piece, having two large, acutely conical lateral teeth, with a smaller central one.* The tongue is also clothed with a horny-looking substance, which is edged anteriorly by a row of about twenty fine teeth.

"The dorsal fins rise in even curves, which are highest in the middle; *the first is about one-third of its own length distant from the second*, which unites with the caudal, the point of junction being marked by a depression. A fold of skin becomes perceptible on the under edge of the tail, a short way behind the anus, and gradually expands into the lower caudal lobe towards the tip of the tail, where its height, in conjunction with that of the upper lobe, equals the greatest height of the second dorsal. Back and sides bluish grey with irregularly scattered yellowish patches. Belly yellowish white."

---

* The generic name "*Entosphenus*, Gill," is not accompanied by a diagnosis.

West coast of North America.

Dr. Ayres does not appear to have understood Richardson's description of the dentition; it agrees quite with that given by himself.

2. Ichthyomyzon astori.

Petromyzon astori, *Girard, U. S. Pac. R.R. Exped. Fish.* p. 380.

The mandibulary plate bears six nearly equal teeth. First dorsal separated from the second by an interspace. Body immaculate. (*Gir.*)

Astoria, Oregon.

3. Ichthyomyzon castaneus.

Girard, l. c. p. 381.

The mandibulary plate bears nine teeth. Eyes small and inconspicuous. Dorsal fins continuous. Body immaculate. (*Gir.*)

Galena, Minnesota.

4. Ichthyomyzon hirudo.

Girard, l. c. p. 382.

The mandibulary plate bears seven teeth. Eyes small and inconspicuous. Dorsal fins continuous. Body immaculate. (*Gir.*)

Fort Smith, Arkansas.

3. MORDACIA.

Caragola *et* Mordacia, *Gray*.

Dorsal fins two, the posterior continuous with the caudal. The maxillary dentition consists of two triangular groups, each with three conical acute cusps; two pairs of serrated lingual teeth.

Chile and Tasmania.

1. Mordacia mordax.

Petromyzon mordax, *Richards. Voy. Ereb. & Terr. Fish.* pl. 38 (dentition not correct).

Mordacia mordax, *Gray, Chondropt.* p. 144, tab. 1. fig. 6 (cop. *Richards.*).

Caragola lapicida, *Gray, l. c.* p. 143, tab. 1. fig. 5, or *Proc. Zool. Soc.* 1851, p. 239.

Petromyzon anwandteri, *Philippi, Wiegm. Arch.* 1863, p. 207, tab. 10. fig. *b* (not correct).

—— acutidens, *Philippi, l. c.* 1864, p. 107, or *Ann. & Mag. Nat. Hist.* 1865, xvi. p. 221.

Mandibulary lamina crescent-shaped, with about nine acute conical cusps, three of which are larger than the others. Suctorial teeth in somewhat distant series, radiating from the centre; the teeth of the series between the mandible and the posterior lip being as numerous as those of the other series, but rather more confluent. The anterior labial teeth converge and are confluent behind; each tooth of the posterior pair is like one half of an elongate oval. Suctorial disk elliptic, with a free lip behind. The first dorsal at a considerable distance from the second. Body immaculate.

Tasmania; Valparaiso.

a. Type of *Caragola lapicida*, 6½ inches long. Valparaiso.
b. Type of *Petromyzon mordax*, 9 inches long. Tasmania. From the Haslar Collection.

The example of which Richardson has given a figure, and which is the type of the species, was evidently always in a bad condition. At all events it had lost the horny coverings of many of the teeth, and especially of the lingual teeth. The prominences on which these teeth stand do not show the same outline of form, as the horny coverings and many of the smaller teeth disappear entirely. Thus the seeming discrepancies between *Caragola* and *Mordacia* are to be explained. That this is really the case is proved by still remaining faint traces of serrature of the lingual prominences in the type specimen of *P. mordax*.

According to Philippi's observations, also this species appears to be sometimes provided with a gular sac.

4. GEOTRIA.

Geotria *et* Velasia, *Gray, Chondropt.* p. 142.

Dorsal fins two, the posterior separate from the caudal. Maxillary lamina with four sharp flat lobes; a pair of long pointed lingual teeth (like the horns of a young antelope).

South Australia and Chile.

1. Geotria australis.

Gray, l. c. pl. 2 (or *Proc. Zool. Soc.* 1851, p. 238).

Skin on the throat very lax, forming a large pouch. The maxillary lamina is thin, crescent-shaped, with four sharp teeth, the middle pair of which are only half as broad as the outer. Mandibulary lamina very low, slightly sinuous. Suctorial teeth in numerous series, rather distant from one another, unicuspid; only those nearest to the mouth somewhat larger, the others small. Only one transverse series of very small teeth between the mandibulary lamina and the posterior lip, which is beset with numerous broad, leaf-like fringes, as is the remainder of the margins of the disk. Suctorial disk subtriangular with the lateral lobes very broad. First and second dorsal fins rather widely separated from each other. Coloration uniform.

South Australia.

a. Type of the species, 20 inches long. Inkarpinki River. Presented by R. A. Pain, Esq.

I recollect having seen a second and still larger specimen of this Lamprey in the collection formerly at Fort Pitt, and now at Netley Hospital.

The use of the extraordinary sac at the throat is not known; the cavity is in the subcutaneous cellular tissue, and does not communicate with the buccal or branchial cavities. It is probably absent in younger individuals.

Philippi (Wiegm. Arch. 1857, p. 266) has described a Lamprey from Chile under the name of *Velasia chilensis*; the example was provided with the sac at the throat, and the description agrees with *Geotria australis*; so that we must assume either that this latter species occurs not only in Australia, but also in Chile, or that *Velasia chilensis* at a certain stage of development is provided with a gular sac. If the latter be the case, the specific distinctness of the two fishes would be questionable. The form of the mouth of the example seen by Philippi, and figured in Wiegm. Arch. 1863, taf. 10. fig. *a*, is exactly intermediate between that of the mouth of the types of *Geotria australis* and *Velasia chilensis*.

2. **Geotria chilensis.**

Velasia chilensis, *Gray, l. c.* p. 143, tab. 1. fig. 4.

Skin on the throat not dilated. The outer lobes of the maxillary dental lamina are broad with a sharp convex edge, the inner narrow and pointed. Mandibulary lamina crescent-shaped, with numerous obtuse points. Suctorial teeth in numerous series, so close together that the teeth have the appearance of imbricate scales. A series of larger, broad, scale-like teeth round the mandibulary lamina. Suctorial disk not dilated, circular. First and second dorsal fins widely separate from each other. Sides and abdomen silvery; back greenish.

Chile; Swan River; New Zealand.

a. Type of the species. Chile.
b. Twenty-one inches long. Swan River. Purchased of Mr. Stevens.
c–f. Twenty-two inches long. New Zealand. Presented by W. Colenso, Esq.

Prof. Kner (Novara, Fisch. p. 421) describes an *Ammocœtes* from Auckland; it is perhaps the young state of this species.

Fam. 2. MYXINIDÆ.

Cyclostomata hyperotreta, *Müller, Abhandl. Ak. Wiss. Berl.* 1834, p. 78.

Body eel-shaped, naked. The single nasal aperture is above the mouth, quite at the extremity of the head, which is provided with four pairs of barbels. Mouth without lips. Nasal duct with cartilaginous rings, penetrating the palate. One median tooth on the palate and two comb-like series of teeth on the tongue. Branchial apertures at a great distance from the head. The inner branchial ducts lead into the œsophagus. A series of mucous sacs along each side of the abdomen. Intestine without spiral valve. Eggs large, with a horny case provided with threads for adhesion.

See Müller, Abhandl. Ak. Wiss. Berlin, 1834, pp. 65–340, with 9 plates; 1837, pp. 15–48, with 3 plates; 1838, pp. 171–252, with 4 plates; 1839, pp. 175–303, with 5 plates; 1843, pp. 109–170, with 5 plates.

Inhabitants of the seas of the temperate regions of both hemispheres; burrow themselves in other fishes, feeding on their flesh.

Two genera :—

One branchial aperture on each side............ 1. *Myxine*, p. 510.
Six or more branchial apertures on each side .... 2. *Bdellostoma*, p. 511.

1. MYXINE.

Myxine, *L.*
Gastrobranchus, *Bl.*

One external branchial aperture only on each side of the abdomen, leading by six ducts to the six branchial sacs.

Northern parts of the Atlantic; Pacific coasts of temperate South America.

1. Myxine glutinosa.

Myxine glutinosa, *L. Syst. Nat.* i. p. 1080; *Retzius, Vet. Akad. Handl.* 1822, p. 233, tab. 3, & 1824, p. 408; *Abildgaard, Schrift. Ges. ntrf. Freund.* x. p. 93, tab. 4; *Fabr. Faun. Groenl.* p. 344; *Flem. Brit. An.* p. 523; *Jenyns, Man.* p. 523; *Müller, Abhandl. Ak. Wiss. Berlin,* 1834; *Fries och Ekstr. Skand. Fisk.* p. 121,

tab. 28; *Nilss. Skand. Faun. Fisk.* p. 750; *Yarrell, Brit. Fish.* 3rd edit. i. p. 12; *Kröyer, Danm. Fisk.* p. 1068; *Gray, Chondropt.* p. 147; *Steenstrup, Œfvers. Dansk. Vid. Selsk. Förhandl.* 1864, p. 233.
Sleepmarken, *Gunner, Trondhj. Handl.* ii. p. 250, tab. 3.
Pihrål, *Kalm, Resa*, i. p. 100.
Hvidaal, *Ström, Söndmör*, p. 287.
Glutinous Hag, *Pennant, Brit. Zool.* iv. p. 33, pl. 20. fig. 15, or, edit. 1812, iii. p. 109.
Gastrobranchus cæcus, *Bl. Ausl. Fisch.* xii. p. 66, taf. 413; *Bl. Schn.* p. 534, tab. 104; *Lacép.* i. p. 525; *Yarr. Brit. Fish.* 2nd edit. ii. p. 612.
Myxine cæca, *Blainv. Faun. Fr.* ii. p. 2, tab. 1 *a*.
—— limosa, *Girard, Proc. Ac. Nat. Sc. Philad.* 1858, p. 223.
Borer, *Couch, Fish. Brit. Isl.* iv. p. 408, pl. 248.

Eight or nine rather slender teeth in each of the two series; the two foremost strongest, and more confluent at the base than the others.

Coasts of Europe and North America.

a. Adult. Firth of Forth. Presented by — Woodfall, Esq.
b. Adult. Newcastle. Presented by Mr. Adamson.
c, d. Several examples.

2. Myxine affinis.

Eleven rather stout teeth in each of the two series, the two foremost strongest and more confluent at the base than the others. Body considerably more slender than that of *M. glutinosa*.

Hab. —— ?

a. Twelve inches long. Presented by Dr. A. Günther.

3. Myxine australis.

Jenyns, Voy. Beagle, Fish. p. 159.

Ten or eleven slender teeth in each of the two series, the three foremost are strongest and confluent at the base, the other teeth remaining separate; in the second series the two innermost teeth are confluent at the base.

Southern coasts of South America.

a, b–d. Adult and half-grown. Sandy Point. Collected by Dr. Cunningham.
e–f. Half-grown. Tyssen Islands. Collected by Dr. Cunningham.

2. BDELLOSTOMA.

Heptatrema, *Duméril.*
Bdellostoma, *Müller.*

Six or more external branchial apertures on each side, each leading, by a separate duct, to a branchial sac.

Southern coasts of the southern hemisphere.

1. Bdellostoma cirrhatum.

Petromyzon cirrhatus, (*Forster*) *Bl. Schn.* p. 532; *Forst. Descript. Anim.* ed. *Licht.* p. 112.

Home, Philos. Trans. 1815, tab. 12. fig. 1.
Bdellostoma hexatrema, *Müll. Abhandl. Ak. Wiss. Berlin,* 1834, p. 79.
—— heterotrema, *Müll. l. c.*
—— heptatrema, *Müll. l. c.*
—— forsterii, *Müller, l. c.* p. 80, and 1838, p. 171.
? Heptatrema cirrhatum, *Schleg. Faun. Japon. Poiss.* p. 310, pl. 143 (Bdellostoma burgeri, *Girard*).

Six or seven gill-openings on each side. Twelve or thirteen teeth in the anterior series, the three foremost confluent at the base; eleven teeth in the posterior series.

South Africa; New Zealand; ? Japan.

a. Adult. Table Bay. Presented by J. L. Statham, Esq.
b. Adult. New Zealand. Presented by Capt. Stokes.
c. Half-grown. Presented by Dr. A. Günther.

2. **Bdellostoma polytrema.**

? Gastrobranchus dombey, *Lacép.* i. p. 531, pl. 23.
Bdellostoma polytrema, *Girard, Proc. Ac. Nat. Sc. Philad.* 1854, p. 199, or in *U. S. Nav. Astron. Exped. Zool.* p. 252, pl. 33.

Fourteen gill-openings on each side. Twelve teeth in each of the series.

Coast of Chile.

The single specimen examined is in a bad state of preservation; and considering the difficulty in distinguishing in examples of that kind between the small gill-openings and pores, I cannot help expressing a doubt whether the number of the apertures is really fourteen.

Subclass VI. LEPTOCARDII.

Skeleton membrano-cartilaginous and notochordal, ribless. No brain. Pulsating sinuses in place of heart. Blood colourless. Respiratory cavity confluent with the abdominal cavity; branchial clefts in great number, the water being expelled by an opening in front of the vent. Jaws none.

Cfr. Müller, Abhandl. Ak. Wiss. Berlin, 1846, p. 198.

One family only—

CIRROSTOMI.

Amphioxini, *Müller, l. c.* p. 204.
Cirrostomi, *Owen, Anat. Vertebr.* i. p. 9.

Characters of the single genus.

1. BRANCHIOSTOMA.

Branchiostoma, *Costa, Cenni Zoologici Napol.* 1834, p. 49.
Amphioxus, *Yarrell, Brit. Fish.* 1836, p. 468.

Body elongate, compressed, scaleless, limbless. Mouth a longitudinal fissure, with subrigid cirri on each side, inferior. Vent at a short distance from the extremity of the tail. A low, rayless finlike fold runs along the back, round the tail, past the vent, to the respiratory aperture. Eye rudimentary. Liver reduced to a blind sac of the simple intestine.

One genus only, occupying the lowest scale in the class of vertebrata. Found imbedded in sand on many coasts of the temperate regions of the northern and southern hemispheres; also in Brazil.

1. Branchiostoma lanceolatum.

Lancelet.
Limax lanceolatus, *Pall. Spicil. Zool.* x. p. 19, tab. 1. fig. 11.
Branchiostoma lubricum, *Costa, l. c.*, and *Faun. Regn. Napol. Pesc.*; *Müll. Abhandl. Ak. Wiss. Berl.* 1842, pp. 79–116, pls. 1–5.
Amphioxus lanceolatus, *Yarrell, Brit. Fish.* 1836, p. 468, or 2nd edit. ii. p. 618, or 3rd edit. i. p. 1 *; *Couch, in Charlesworth's Mag. Nat.*

---

* Not the specimen from Moray Firth, which was probably a young *Myxine*; and the article by Mr. Wilde refers to a *Salpa*.

Hist. ii. 1838, p. 381; *Sundevall & Lovén, Forhandl. Skand. Naturf.* 2de möde, Kjöbenh. 1841, p. 280; *Rathke, Bemerkungen über den Bau des A. l.*, Königsberg, 1841, 4to; *Goodsir, Trans. R. Soc. Edinb.* xv. p. 1; *Kölliker, in Müll. Arch.* 1843, p. 32 (organ of smelling); *Couch, Fish. Brit. Isl.* iv. p. 415, pl. 248.

Amphioxus belcheri, *Gray, Proc. Zool. Soc.* 1847, p. 35.

Branchiostoma belcheri, *Gray, Chondropt.* p. 150.

—— caribæum, *Sundev. Œfvers. Vet. Akad. Förhandl.* 1853, p. 11.

—— elongatum, *Sundev. l. c.* 1852, p. 147.

—— lanceolatum, *Gray, Chondropt.* p. 150; *Nilss. Skand. Faun. Fisk.* p. 753; *Max Schultze, Verhand. ntrh. Vereins preuss. Rheinl.* xix. *Sitzgsber.* p. 197, and in *Siebold & Kölliker's Zeitschr.* iv. 1852, p. 416, taf. 13. figs. 5 & 6; *Müller, Monatsber. Ak. Wiss. Berl.* 1851, p. 474; *Quatrefages, Compt. Rend.* 1845, xxi. p. 519; *Kröyer, Danm. Fisk.* iii. p. 1087; *Marcusen, Ann. & Mag. Nat. Hist.* xiv. 1864, pp. 151, 319, or in *Rev. et Mag. Zool.* 1864, xvi. p. 79; *Steenstrup, Œfvers. Dansk. Vid. Selsk. Förhandl.* (1863) 1864, p. 238; *Bert, Compt. Rend.* 1867, Aug. 26, p. 364, or in *Ann. & Mag. Nat. Hist.* xx. p. 302; *Kowalevsky, Mém. Ac. Sc. St. Pétersb.* 1867, xi. no. 4.

Transparent, slightly iridescent. About 3 inches long.

a. Adult. Polperro. Presented by J. Couch, Esq.

b. Numerous examples. Naples. Presented by Prof. Kölliker.

c. Type of *A. belcheri*. Borneo. Presented by Vice-Admiral Sir E. Belcher, K.C.B.

d. Many specimens, taken in a dredge, in 10–12 fathoms, in Bass Straits. Voyage of the 'Herald.'

e–g. Adult. Presented by Vice-Admiral Sir E. Belcher, K.C.B.

h. Adult.

ADDENDA.

Page 4. **Sternarchus macrostoma.**

b. Young. Peruvian Amazons. From Mr. Bartlett's Collection.

Page 5. **Rhamphichthys rostratus.**

f. Fine specimen, 35 inches long. Surinam. From Hr. Kappler's Collection.

Page 7. **Sternopygus carapus.**

q–r. Adult. Surinam. From Hr. Kappler's Collection.

Page 9. **Carapus fasciatus.**

z. Fine specimen. Surinam. From Hr. Kappler's Collection.

Page 16. **Symbranchus marmoratus.**

k. Fine specimen, 34 inches long. Surinam. From Hr. Kappler's Collection.

Page 50. **Myrophis punctatus.**

b. West Africa. Presented by Th. Moore, Esq.
c. Surinam. From Hr. Kappler's Collection.

Page 154. **Siphonostoma typhle.** Add to the synonymy:—

Syngnathus argentatus, *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 464.

a′–b′. Half-grown. Algiers. Presented by Lieut.-Col. Playfair.

Page 157. **Syngnathus acus.** Add to the synonymy:—

Syngnathus variegatus, *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 463, *and* Syngnathus bucculentus, *Kessler, l. c.* p. 468.

a′–d′. Young. Algiers. Presented by Lieut.-Col. Playfair.

Page 164. **Syngnathus abaster.**

a–b. Algiers. Presented by Lieut.-Col. Playfair.—D. 31–32. Osseous rings 18+36–37.

Page 170. **Syngnathus cyanospilus.**

i. Young. Gulf of Suez. Presented by R. MacAndrew, Esq.

Page 183. **Doryichthys lineatus.**

g–k. Adult and half-grown. Surinam (fresh water). From Hr. Kappler's Collection.

Page 191. **Nerophis æquoreus.**

a′–b′. Adult. North of the Azores. Collected by Dr. R. Cunningham.

Page 193. **Nerophis teres.**

Scyphicus teres, *Kessler, Bull. Soc. Nat. Mosc.* 1859, ii. p. 460.

a–b. Algiers. Presented by Lieut.-Col. Playfair.

Page 196.

3. Solenostomus lettiensis.

Bleek. Act. Soc. Sc. Indo-Neerl. viii. *Amboina*, xii. p. 3.

D. 35. Osseous rings 22–23+50–51.

Radiating lines of the operculum spiny; snout with a conical tubercle above, in front of the eyes. Tail about as long as the body. (*Blkr.*)

Letti.

Page 198. Add a new species:—

2. Acentronura tentaculata.

Body slightly compressed, its greatest depth being equal to the length of the head (without snout). Snout very short, shorter than the postorbital part of the head. The profile before the eyes is deeply concave, the hind part of the head being strongly compressed. Twelve body-rings. Dorsal fin opposite to the vent, on four rings, apparently composed of thirteen rays. Tail rather longer than the body. Body and tail with scarcely any tubercles, but with series of long, fringed tentacles and filaments; also the head bears similar appendages. A closed egg-pouch under the tail of the male.

Red Sea.

a. Adult male, two inches long. Gulf of Suez. Presented by R. MacAndrew, Esq.

Page 200. **Hippocampus antiquorum.**

a–c. Adult. Algiers. Presented by Lieut.-Col. Playfair.

Page 211.

Erase *Balistes adspersus* (Tschudi) from the list of doubtful species, Prof. Peters having informed me that it is identical with *B. maculatus* (Bl. Schn.).

Page 213. **Balistes maculatus.** Add to the synonymy:—

Balistes adspersus, *Tschudi, Faun. Per. Pesc.* p. 31.

a'. Young. Siam. Purchased of Mr. Jamrach.
b'–c'. Young. Formosa. From Consul Swinhoe's Collection.
d'. Young. Malayan peninsula. From Dr. Cantor's Collection.
e'. Very young. Zanzibar. From Dr. Kirk's Collection.
f'. Very young. West Indies. Purchased of M. Sallé.

Page 216. **Balistes forcipatus.**

e. Half-grown. West Africa. From the Godeffroy Museum, as *Balistes liberiensis* (Steindachner).

Page 218. **Balistes mitis.** Add to the synonymy:—
Balistes capistratus, *Lacép.* ed. *Pillot*, Paris, 1831, vi. p. 126 (not *Tiles.*)

Page 223. **Balistes flavimarginatus.** Add to the synonymy:—
Balistes brasiliensis, *Bl. Schn.* p. 470 (fide *Peters*).

Page 256. **Ostracion trigonus.**

g. Young. Bahia. Purchased of Mr. Cutter.

Page 297. **Tetrodon hispidus.**

a'. Young. Suez. Presented by R. MacAndrew, Esq.

Page 326. **POLYPTERUS.**

Dr. Steindachner (Sitzgsber. Ak. Wiss. Wien, 1869, lx. June 10) has made the very interesting observation that certain young individuals from the Senegal, 7–9 inches long, are provided with a long external gill. The examples have 14 or 15 dorsal spines, and are regarded as the type of a distinct species, *P. lapradei*, which is figured. However, the other characters do not appear to me to be of sufficient value to distinguish this form specifically; and as I have seen many young *Polypteri*, down even to 5 inches in length, without a trace of external gills, I am inclined to regard the occurrence of these organs in some individuals, as another instance of a casual, but not normal dimorphism in one and the same species.

Page 326. **Polypterus bichir.**

β'. Seventeen dorsal finlets.

a'. Adult: stuffed. Egypt. Purchased of M. Parzudaki.

δ'. Fourteen dorsal finlets.

g'. Adult: stuffed. Interior of West Africa. From Lander's Expedition.

Page 333. **ACIPENSER.**

Prof. Brandt (Bull. Ac. Sc. St. Pétersb. 1869, p. 171) has arrived at the same conclusion as myself with regard to the distinction of species. He rejects most of the species established by Heckel, and regards those recently named by Aug. Duméril as inadmissible. The synonymy indicated by him differs from that given in this work in the following points:—

Page 336. *Acipenser nudiventris* (Lovetzky) is distinguished from *A. glaber*.

Page 336. *Acipenser brandtii* is said to be a hybrid between *A. huso* and *A. glaber*.

Page 337. *Acipenser nasus* is identical with *A. naccarii*.

Page 341. *Acipenser heckelii* is identical with *A. naccarii*.

Finally he gives preliminary diagnoses of two new species (*Acipenser schrenckii* and *A. bærii*); but as he has omitted to give the number of the lateral scutes, I am unable to introduce them into the system.

Page 366. **Carcharias obscurus.**

Storer, Mem. Amer. Acad. ix. 1867, p. 219, pl. 36. fig. 2.

Page 381. **Zygæna malleus.**

Storer, Mem. Amer. Acad. ix. 1867, p. 229, pl. 38. fig. 3.

Page 386. **Mustelus canis.**

Storer, Mem. Amer. Acad. ix. 1867, p. 227, pl. 37. fig. 2, figures an American example; but his description does not contain any information on its embryology.

Page 389. **Lamna cornubica.**

Carcharias griseus, *Storer, Mem. Amer. Acad.* ix. 1867, p. 217, pl. 36. fig. 1.

Page 390. **Lamna spallanzanii.**

Lamna punctata, *Storer, Mem. Amer. Acad.* ix. 1867, p. 225, pl. 37. fig. 1.

Page 392. **Carcharodon rondeletii.**

Carcharias atwoodi, *Storer, Mem. Amer. Acad.* ix. 1867, p. 222, pl. 36. fig. 4.

Page 393. **Alopecias vulpes.**

Carcharias vulpes, *Storer, Mem. Amer. Acad.* ix. 1867, p. 221, pl. 36. fig. 3.

A skeleton in the Liverpool Museum has 364 vertebræ.

Page 394. **Selache maxima.**

Selache maxima, *Storer, Mem. Amer. Acad.* ix. 1867, p. 229, pl. 37. fig. 3.

Cetorhinus blainvillei, *Capello, Jorn. Ac. Sc. Lisb.* 1869, p. 233, with fig.

Page 411. **Chiloscyllium indicum.**

a′–c′. Young. From the Collection of the East-India Company.

Page 427. **Læmargus rostratus.**

Capello, Jorn. Acad. Sc. Lisb. vi. 1869, p. 146, tab. 9. fig. 2.

Page 441.

Rhinobatus productus is from California.

Page 442. Add a new species:—

1*a*. **Rhinobatus spinosus.**

Anterior nasal valve not dilated laterally. Snout much produced, the distance between the outer angles of the nostrils being one-half of that between the mouth and the end of the snout. The rostral ridges are confluent, very narrow, with a very small and short groove at the base, and in their entire length provided with spines. Mouth nearly straight. Compressed spines with dilated base along the median line of the back, on the shoulder, and above the eye and spiracle; the entire upper surface rough. Snout white.

Mexico.

a. Stuffed, 13 inches long. Purchased.

ALPHABETICAL INDEX.

Aal, 28.
abaster (Syngnathus), 164, 515.
abboti (Syngnathus), 160.
abbreviata (Aphthalmichthys), 92.
abbreviata (Moringua), 92.
abdominalis (Hippocampus), 199.
Abu senduk, 260.
Acanthaluteres, 229.
Acanthias, 417.
acanthias (Galeus), 417.
acanthias (Spinax), 418.
Acanthidium, 424.
acanthonotum (Scyllium), 403.
Acanthosoma, 318.
Acanthostracion, 255.
acanthura (Pastinaca), 477.
Acara muca, 251.
Acentronura, 198.
Acerana, 266.
Achirophichthys, 54.
acicularis (Syngnathus), 161.
Acipenser, 333, 517.
Acipenseridæ, 332.
Acipenserini, 332.
acronotus (Squalus), 369.
aculeata (Aracana), 266.
aculeata (Mola), 318.
aculeata (Rhina), 431.
aculeata (Squatina), 430.
aculeatus (Acipenser), 340.
aculeatus (Balistapus), 223.
aculeatus (Balistes), 223, 224, 226.
aculeatus (Doryichthys), 183.
aculeatus (Orthragoriscus), 318.
acuminata (Muræna), 83.
acuminatus (Ophichthys), 83.
Acus aristotelis, 154.
acus (Raja), 468.
acus (Syngnathus), 154, 157, 164, 515.
acuta (Myliobatis), 488.
acuticaudatus (Leptocephalus), 140.
acutidens (Aprion), 361.
acutidens (Aprionodon), 361.
acutidens (Carcharias), 361.
acutidens (Petromyzon), 508.
acutirostris (Acipenser), 344.
acutirostris (Anguilla), 29.
acutirostris (Ichthyapus), 90.
acutirostris (Muræna), 66, 127.
acutirostris (Ophich.), 90.
acutirostris (Pristis), 437.
acutus (Carcharias), 358.
acutus (Scoliodon), 358.
adspersa (Rhinoptera), 494.
adspersus (Balistes), 211, 516.
adspersus (Ophich.), 57.
ægyptiaca (Anguilla), 29.
æpyptera (Ammocœtes), 500.
æquilabiatus (Gymnotus), 7.
æquoreus (Nerophis), 191.
æquoreus (Scyphius), 191.
æquoreus (Syngnathus), 191.
aerostaticus (Tetrodon), 295.
æthiopicus (Protopterus), 322.
Aëtobatis, 492.
Aëtoplatea, 488.
afer (Gymnothorax), 123.
affinis (Chilomycterus), 314.
affinis (Chimæra), 350.
affinis (Myxine), 511.
affinis (Rhinoptera), 494.
affinis (Syngnathus), 163.
afra (Muræna), 123.
afra (Murænophis), 123.
africana (Raja), 471.
africanum (Scyllium), 405.
africanus (Anacanthus), 472.
africanus (Rhachinotus), 472.
africanus (Urogymnus), 472.
agassizii (Acipenser), 344.
agassizii (Antaceus), 344.
agassizii (Gymnothorax), 110.
agassizii (Muræna), 110.
agassizii (Raja), 465.
agassizii (Syngnathus), 157, 164.
agassizii (Uraptera), 465.
Aiereba, 482.
Aiguillat, 418.
akajei (Trygon), 478.
alba (Muræna), 14.
alba (Raja), 459.
albicaudatus (Balistes), 218.
albifrons (Gymnotus), 2.
albifrons (Sternarchus), 2.
albimarginatus (Gymnothorax), 122.
albinus (Pneumabranchus), 14.
albirostris (Corythoichthys), 170.
albirostris (Syngnathus), 170.
albomarginata (Muræna), 122.
albomarginatus (Carcharias), 370.
albomarginatus (Prionodon), 370.
alboplumbeus (Gastrophysus), 278.
alboplumbeus (Tetraodon), 278.
albus (Carapus), 9.
albus (Gymnotus), 9.

Aledon, 318.
Alepocephalus, 145.
aleutensis (Acipenser), 335.
Aleuteres, 229.
alexandri (Acipenser), 345.
alexandri (Antaceus), 345.
alexandrini (Orthag.), 319.
algeriensis (Syngnathus), 164.
algiricus (Hippocampus), 198.
Alopecias, 393.
alopecias (Squalus), 394.
Alopias, 393.
altavela (Pteroplatea), 486.
altavela (Raja), 486.
altavela (Trygon), 486.
alternans (Ophisurus), 81.
alternans (Syngnathus), 162.
altipinnis (Conger), 38.
altipinnis (Microdonophis), 74.
altipinnis (Muræuopsis), 74.
altipinnis (Ophichthys), 74.
altirostris (Anguilla), 29.
altus (Leptocephalus), 144.
alusis (Muræna), 131.
Alutarius, 229.
Aluteres, 229, 251.
Amanses, 229.
amblodon (Anguilla), 37.
amblyodon (Echidna), 132.
amblyodon (Muræna), 132.
Amblyrhynchote, 271.
amblyrhynchus (Carcharias), 368.
amblyrhynchus (Prionodon), 368.
amboinensis (Anguilla), 34.
amboinensis (Balistes), 218.
amboinensis (Canthogaster), 302.
amboinensis (Carcharias), 372.
amboinensis (Ophichthys), 61.
amboinensis (Prionodon), 372.
amboinensis (Psilonotus) 302.
amboinensis (Tetrodon), 302.
americana (Raja), 455.
americanus (Acanthias), 418.
americanus (Acanthorhinus), 426.
americanus (Balistes), 220.
americanus (Odontaspis), 392.
americanus (Petromyzon), 502.
americanus (Squalus), 392, 426.
Amia, 325.
Amiidæ, 324.
Ammocœtes, 501.
ammocryptus (Tetraodon), 282.
amphacanthoides (Alutarius), 251.
amphibia (Rhinocryptis), 322.
Amphibichthys, 322.
Amphioxini, 513.
Amphioxus, 513.
Amphipnoina, 13.
Amphipnous, 13.
ampullaceus (Ophiognathus), 22.
ampullaceus (Saccopharynx), 22.
Anacanthus, 255, 471.
Anago, 42.
Anagoides, 42.
analis (Conger), 41.
analis (Ophisoma), 41.
analis (Orthagoriscus), 319.
anatina (Muræna), 115.
anceps (Cataphractus), 148.
anceps (Dalophis), 84.
anceps (Ophichthys), 84.
Anchisomus, 271.
ancidda (Anguilla), 32.
ancylostomus (Rhamphobatis), 440.
ancylostomus (Rhina), 440.
ancylostomus (Rhynchobatus), 440.
andersonii (Syngnathus), 169.
aneitensis (Anguilla), 34.
Angel-fish, 430.
angelus (Squatina), 430.
anginosus (Aluterus), 251.
angio (Heptanchus), 398.
Anguilla, 23.
anguilla (Muræna), 27, 29, 31, 35.
anguillaris (Tribranchus), 28.
anguilliformis (Protopterus), 322.
Anguillina, 23.
anguina (Muræna), 135.
anguineus (Nerophis), 191.
anguineus (Syngnathus), 191.
Anguisurus, 54.
angulosus (Balistes), 214.
angusticeps (Anchisomus), 287.
angusticeps (Tetrodon), 287.
angustidens (Anguilla), 23.
angustidens (Congrus), 46.
angustifolium (Polyodon), 347.
angustifolium (Spatularia), 347.
angustifrons (Triacanthus), 210.
angustus (Hippocampus), 200.
anisodon (Squalus), 432.
annectens (Lepidosiren), 322.
annectens (Protopterus), 322.
annulata (Muræna), 81.
annulatum (Scyllium), 407.
annulatus (Gymnothorax), 81.
annulatus (Nerophis), 192.
annulatus (Rhinobatus), 446.
annulatus (Scyphius), 190.
annulatus (Squalus), 407.
annulatus (Syrrhina), 446.
annulatus (Tetrodon), 283.
anomalus (Triacanthodes), 208.
anomalus (Triacanthus), 208.
Anoplocapros, 266.
Anosmius, 271, 300.
Antaceus, 333.
antarctica (Chimæra), 351.
antarcticus (Callorhynchus), 351.

antarcticus (Mustelus), 387.
antennatus (Chilomycterus), 311.
antennatus (Diodon), 311.
antiquorum (Hippocampus), 199.
antiquorum (Pristibatis), 438.
antiquorum (Pristis), 436, 438.
anwandteri (Petromyzon), 508.
Aodon, 496.
Aphthalmichthys, 90.
apicalis (Ophichthys), 70.
apicalis (Ophisurus), 70.
appendiculata (Murenophis), 94.
appendiculatus (Squalus). 414.
appendix (Petromyzon), 500.
Aprion, 361.
Aprionodon, 361.
Apsicephalus, 272.
aptenodytum (Cheilobranchus), 18.
Apterichthys, 54.
Apterigia, 14.
Apteronotus, 2.
aquila (Myliobatis), 489, 490.
aquila (Pastinaca), 489.
aquila (Raja), 489.
arabica (Muræna), 46.
Aracana, 266.
arcticus (Boreogaleus), 377.
arcticus (Galeocerdo), 377.
arcticus (Squalus), 377.
arcuatus (Balistes), 226.
arcus (Acanthostracion), 265.
arcus (Ostracion), 265.
arenata (Thyrsoidea), 113.
arenatus (Carapus), 7.
areolatus (Holocanthus), 310.
argentatus (Promecocephalus (276).
argentatus (Siphonostomus), 154.
argentatus (Syngnathus), 154, 515.
argentatus (Tetrodon), 276.
argentea (Chimæra), 349.
argentea (Muræna), 31.
argenteus (Petromyzon), 500, 503.
argenteus (Tetrodon), 276.
argulus (Cœlonotus), 189.
argulus (Squalus), 408.
argus (Ostracion), 260.
argus (Stigmatophora), 189.
argus (Syngnathus), 189.
argyropleura (Tetrodon), 276.
argyrostictus (Syngnathus), 172.
armatus (Balistapus), 218.
armatus (Balistes), 218, 223.
armatus (Rhinobatus), 443.
armatus (Urolophus), 485.
Arothron, 271, 290.
arracana (Anguilla), 27.
artedi (Pristiurus), 407.
artedii (Rhamphichthys), 6.
artedi (Scyllium), 406.
arundinaceus (Ptyobranchus), 90.
arundinaceus (Syngnathus), 161.
asellus (Chelichthys), 286.
asper (Diodon), 316.
aspera (Raja), 456, 467.
asperrima (Raja), 471.
asperrimus (Anacanthus), 472.
asperrimus (Urogymnus), 471.
aspersus (Monacanthus), 231.
aspilus (Tetrodon), 291.
aspricaudus (Monacanthus, 242.
assasi (Balistes), 224.
asterias (Dasybatis), 458.
asterias (Galeus), 386.
asterias (Raja), 460.
astori (Ichthyomyzon), 507.
astori (Petromyzon), 507.
Astrape, 454.
astrotænia (Crayracion), 295.
astrotænia (Tetrodon), 295.
ater (Herpetoichthys), 68.
ater (Ophichthys), 68.
aterrima (Muræna), 124.
aterrima (Tæniophis), 124.
aterrima (Thyrsoidea), 124.
aterrimus (Gymnothorax), 124.
atinga (Diodon), 306.
atlantica (Thrysoidea), 97.
atlanticus (Callorhynchus), 349.
Atopomycterus, 315.
atra (Raja), 461.
Atractosteus, 328.
atratus (Tetraodon), 276.
atrocissimus (Tryg.), 472.
Attilus, 342.
atwoodi (Carcharias), 392, 518.
aucklandii (Anguilla), 33.
augusti (Muræna), 97.
augusti (Thyrsoidea), 97.
auloptera (Muræna), 132.
aurantiacus (Balistes), 254.
aurantiacus (Monacanthus), 254.
aurantiacus (Urolophus), 485.
auratus (Conger), 41.
auratus (Monacanthus), 240.
aureolus (Balistes), 215.
auriga (Monacanthus), 239.
aurita (Aracana), 266.
auritus (Ostracion), 266.
auromarginatus (Balistes), 221.
auronitens (Doryichthys), 182.
australis (Anguilla), 36.
australis (Callorhynchus), 351.
australis (Chimæra), 351.
australis (Geotria), 508.
australis (Myxine), 511.
australis (Trygonoptera), 486.
avisotis (Anguilla), 23.
ayraudi (Balistes), 244.
ayraudi (Monacanthus), 244.
ayresii (Acipenser), 337.
ayresii (Antaceus), 337.
ayresii (Petromyzon), 505.
axillaris (Sternopygus), 8.
azureus (Balistes), 214.

baccidens (Ophiurus), 78.
bærii (Acipenser), 517.
bagio (Conger), 46.
bagio (Muræna), 46.
bagio (Murænesox), 46.
bajacu (Tetraodon), 282.
balearica (Congromuræna), 41.

balearica (Muræna), 41.
balearicus (Conger), 41.
balistæformis (Holocanthus), 305.
Balistapus, 212.
Balistes, 211.
Balistina, 211.
bancroftii (Torpedo), 453.
bangko, 70.
banko (Ophichthys), 70.
banksiana (Raja), 497.
banksii (Rhinobatus), 446.
banksii (Syrrhina), 446.
barbatus (Alutarius), 255.
barbatus (Anacanthus), 255.
barbatus (Balistes), 255.
barbatus (Crossorhinus), 414.
barbatus (Pogonognathus), 255.
barbatus (Psilocephalus), 255.
barbatus (Squalus), 414.
barbatus (Stomiasunculus), 145.
basilevskianus(Tetrodon), 291.
batis (Raja), 463.
Batoidei, 434.
Batrachops, 271.
battaræ (Orthragoriscus), 320.
batuensis (Muræna), 119.
baueri (Aleuterius), 235.
Bdellostoma, 511.
belcheri (Amphioxus), 514.
belcheri (Branchiostoma), 514.
belcheri(Ichthyocampus), 177.
Belonichthys, 179.
Belonopsis, 21.
Beluga, 338.
bengalensis (Anguilla), 27.
bengalensis (Muræna), 27.
bengalensis (Murænesox), 46.
bengalensis (Ophisternon), 16.
bengalensis (Synbranchus), 16, 17.
bennetti (Gymnomuræna), 135.
bennettii (Psilonotus), 301.
bennetti (Tetrodon), 301.
bennetti (Tropidichthys), 301.
bennettii (Trygon), 480.
berardi (Aleuteres), 251.
berlandieri (Atractosteus), 329.
berlandieri (Lepisosteus), 329.
bernsteinii (Doryichthys), 183.
bernsteinii (Murænopsis), 71.
bernsteinii (Ophichthys), 71.
bertolonii (Monacanthus), 241.
biaculeatus (Balistes), 209, 210.
biaculeatus (Gastrotok.), 194.
biaculeatus (Syngnathus), 194.
biaculeatus (Triacanthus), 209, 210.
bibronii (Anguilla), 29.
bibronii(Leptoceph.),140.
bicaudalis (Ostracion), 257.
bichir (Polypterus). 326, 517.
bicoarctatus (Syngnathus), 176.
bicolor (Ammocœtes), 500.
bicolor (Anguilla), 35.
bicolor (Balistes), 220.
bicolor (Lamnostoma), 86.
bicolor (Moringua), 91.
bicolor (Ophichthys), 86.
bicolor (Petromyz.), 505.
bicolor (Sphagibranchus), 86.
bicolor (Tetrodon), 276.
bicuspis (Hippocampus), 205.
bicuspis (Ostracion), 259.
bifilamentosus (Monacanthus), 237.
bilineata (Muræna), 119.
bilineatus (Doryichthys), 181.
bimaculatus (Tetrodon), 279.
binoculata (Raja), 464.
binoculata (Uraptera), 464.
biocellatus (Cœlonotus), 188.
biocularis (Raja), 461.
bipes (Balistes), 209.
biserialis (Syngnathus), 172.
bison (Lepisosteus), 330.
bispinatus (Scymnus), 428.
bispinosus (Myliobatis), 488.
bituberculatus (Ostracion), 260.
bivium (Scyllium), 405.
Blaataske, 424.
blainvillei(Cetorhin.),518.
blainvillei (Leptonotus), 162.
blainvillianus (Syngnathus), 162.
blainvillii (Acanthias), 419.
blainvillii (Spinax), 419.
bleekeri (Anguilla), 36.
bleekeri (Carcharias), 370.
bleekeri (Doryichthys), 182.
bleekeri (Enchelynassa), 136.
bleekeri (Microphis), 182.
bleekeri (Prionodon), 370.
bleekeri (Trygon), 475.
blochii (Cestracion), 380.
blochii (Orthragoriscus), 318.
blochii (Rhamphichthys), 5.
blochii (Rhinobatus),447.
blochii (Sphyrna), 380.
blochii (Syngnathoides), 194.
blochii (Syngnathus), 194.
blochii (Syrrhina), 447.
blochii (Tetraodon), 271.
blochii (Thyrsoidea), 94.
blochii (Triacanthus), 210.
blochii (Zygæna), 380.
Blue Shark, 364.
boaja, 180.
bocagei (Atopomycterus), 308.
bokhat, 441.
bombifrons (Ostracion), 261.
bonapartii (Myliobatis), 490.
bonapartii (Ophichthys), 69.
bonapartii (Ophisurus), 69.
bonapartii (Pœcilocephalus), 69.

bonapartii (Sternarchus), 3.
bonapartii (Sympterygia), 470.
bonasus (Raja), 494.
bondarus (Tetrodon),298.
boops (Centaurus), 268.
boops (Ostracion), 268.
borealis (Ammocœtes), 500.
borealis (Chimæra), 347.
borealis (Læmargus), 426, 427.
borealis (Notorhynchus), 399.
borealis (Scymnus), 427.
borealis (Squalus), 426.
Borer, 511.
borneensis (Carcharias), 371.
borneensis (Gymnothorax), 94.
borneensis (Prionodon), 371.
boro (Ophichthys), 77.
boro (Ophisurus), 77.
borysthenis (Antaceus), 338.
boschi (Gymnothorax), 123.
boschii (Muræna), 123.
bostoniensis (Anguilla), 31.
bostoniensis (Muræna), 31.
Bouclé, 428.
bougainvillii (Rhinobatus), 445.
bougainvillii (Syrrhina), 445.
bovina (Myliobatis), 490.
Bow-fin, 325.
Brachaluteres, 229.
brachiatus (Diodon), 306.
Brachycephalus, 272.
brachycephalus (Syngnathus), 156.
brachycephalus (Uranichthys), 67.
Brachyconger, 45.
Brachyrhamphichthys, 6.
brachyrhynchus (Acipenser), 337.
brachyrhynchus (Antaceus), 337.
brachyrhynchus (Prionodon), 370.
brachyrhynchus (Syngnathus), 155.
brachysoma (Ophisurus), 78.
brachysoma (Pisoodonophis), 78.
brachysoma (Triacanthus), 209.
Brachysomophis, 54.
brachyurum (Solenostoma), 152.
brachyurus (Carapus), 9.
brachyurus (Carcharias), 369.
brachyurus (Doryichthys), 184.
brachyurus(Gymnotus),9.
brachyurus (Ophichthys) 55.
brachyurus (Syngnathus), 184.
bramante (Læviraja),466.
branchialis (Ammocœtes), 504.
branchialis (Petromyzon), 504.
Branchiostoma, 513.
branderiana (Cæcilia), 89.
brandtii (Acip.), 336, 517.
brasiliensis (Balist.), 517.
brasiliensis (Centrurophis), 73.
brasiliensis (Conger), 40, 47.
brasiliensis (Isistius), 429.
brasiliensis(Muræna),120.
brasiliensis (Narcine),453.
brasiliensis (Ophichthys), 73.
brasiliensis (Raja), 455.
brasiliensis (Rhinoptera). 493.
brasiliensis (Scymnus), 429.
brasiliensis (Sternarchus), 3.
brasiliensis (Torpedo), 453.
brevicaudatum (Ginglymostoma), 408.
brevicaudus (Diaphanichthys), 142.
brevicaudus (Leptocephalus), 142.
breviceps(Hippocampus), 200.
breviceps (Ophichthys), 62, 82.
breviceps (Ophisurus), 62, 82.
breviceps Pisoodonophis), 82.
brevicornis (Ostracion), 264.
brevicuspis (Congrus), 46.
brevipinna (Aprion), 361.
brevipinna (Carcharias), 361.
brevipinna (Læmargus), 427.
brevipinna (Scymnus), 427.
brevipinna (Somniosus), 426.
brevirostris (Acipenser), 341.
brevirostris (Anguilla), 27.
brevirostris (Carcharias), 362.
brevirostris (Corythoichthys), 167.
brevirostris (Hippocampus), 198, 200.
brevirostris (Hypoprion), 362.
brevirostris (Leptocephalus), 141.
brevirostris (Pristis), 437.
brevirostris (Rhamphichthys), 6.
brevirostris (Rhinobatus), 447.
brevirostris (Sphagebranchus), 85.
brevirostris (Syngnathus), 157, 165, 167.
brevirostris (Syrrhina), 447.
brevirostris(Triacanthus), 209.
brevis (Cephalus), 317.
brevis (Ptyobranchus),90.
brevispinosus (Monacanthus), 229.
brevissimus (Balistes), 214.
broccus (Balistes), 229.
broccus (Monacanthus), 239.
broekii (Monacanthus), 241.
brockmeyeri (Ophichthys), 61.
brockmeyeri (Ophisurus), 61.
Broncho, 38.
brownii (Aleuterius), 249.
brownii (Monacanthus), 249.
brucco (Trygon), 477.
brucus (Squalus), 428.
brummeri (Muræna),128.
brummeri (Pseudechidna), 128.

brummeri (Strophidon), 128.
brunneus (Tetraodon), 271.
bucculentus(Syngnathus), 157, 515.
budi (Syngnathus), 176.
buffalo (Acipenser), 339.
buffalo (Antaceus), 339.
bullata (Muræna), 108.
bullatus (Gymnothorax), 109.
buniva (Balistes), 227.
burgeri (Bdellostoma), 512.
bürgeri (Halælurus), 404.
bürgeri (Scyllium), 404.
buri (Balistes), 223.
buroënsis(Gymnothorax), 114.
buroënsis (Muræna), 114.
bursa (Balistapus), 219.
bursa (Balistes), 219.
bursarius (Triodon), 270.

caboverdianus (Ginglymostoma), 408.
cæca (Muræna), 89.
Cæcilia, 54.
Cæcilophis, 54.
Cæcula, 54.
cæcus (Apterichthys), 89.
cæcus (Gastrobranchus), 511.
cæcus (Ophichthys), 89.
cæcus (Petromyzon), 504.
cæcus (Sphagebranchus), 89.
cærulescens (Balistes), 222.
cæruleus (Ammocœtes), 500.
cæruleus (Carcharias), 363.
cæruleus (Carcharinus), 365.
cæruleus (Cyanichthys), 314.
cæruleus (Diodon), 312.
cæruleus (Squalus), 363, 365.
calabaricus (Calamoichthys), 328.
calamara (Tetraodon), 295.
calamaroides(Tetraodon), 294.
Calamoichthys, 327.
calamus (Ophichthys), 74.
calceus (Acanthidium), 423.
calceus (Centrophorus), 423.
californica (Narcine), 452.
californica (Rhina), 431.
californica (Torpedo), 452.
californica (Triakis), 384.
californicus (Mustelus), 385.
californicus (Myliobatis), 489.
californiensis (Doryichthys), 186.
californiensis (Doryrhamphus), 186.
californiensis (Ophisurus), 55.
californiensis (Syngnathus), 160.
caligans (Symbranchus), 17.
Callechelys, 54.
callensis (Anguilla), 29.
callisoma (Herpetoichthys), 58.
callorhyncha (Muræna), 122.
Callorhynchus, 351.
callorhynchus (Chimæra), 351.
calolepis (Balistes), 221.
calori (Diodon), 309.
calorii (Chilomycterus), 309.
calva (Amia), 325.
camelinus (Lactophrys), 259.
camelopardalis (Hippocampus), 205.
camtschaticus (Petromyzon), 500.
canaliculata (Pristis), 438.
canariensis (Anguilla), 29.
canariensis (Pteroplatea), 486.
cancellata (Muræna), 110.
cancellata (Thyrsoidea), 110.
cancellatus (Gymnothorax), 110.
cancrivora (Saurenchelys), 48.
cancrivorus (Ophichthys), 78.
cancrivorus (Ophisurus), 78.
cancrivorus (Pisoodonophis), 78.
candidissimus (Leptocephalus), 139.
canicula (Scyllium), 402.
canicula (Squalus), 402, 403.
canina (Amia), 325.
canina (Muræna), 94.
canis (Galeus), 379.
canis(Mustelus), 386, 518.
canis (Squalus), 386.
Canthidermis, 212.
Canthogaster, 272.
cantori (Anguilla), 23.
cantoris (Monacanthus), 236.
capense (Scyllium), 404.
capensis (Aledon), 318.
capensis (Anguilla), 24, 33.
capensis (Astrape), 454.
capensis (Callorhynchus), 351.
capensis (Carcharodon), 392.
capensis (Leptocephalus), 143.
capensis (Leptorhynchus), 66.
capensis (Narcine), 454.
capensis (Raja), 454, 455.
capensis (Torpedo), 454.
capistratus (Balistes), 226, 517.
capistratus (Tetrodon), 303.
capitone (Anguilla), 32.
capriscus (Balistes), 217.
Capropygia, 266.
Caragola, 507.
caramuru (Murenophis), 121.
Carapo, 9.
carapo (Gymnotus), 7, 9.
Carapus, 8.
carapus (Sternopygus), 7.
carbonarius (Acipenser), 339.
carce (Ichthyocampus), 176.
carce (Syngnathus), 176.
Carcharias, 357.
carcharias (Squalus), 372, 426.
Carchariidæ, 357.
Carchariina, 357.
Carcharodon, 391.
carduus (Tetrodon), 292.
caria (Tetrodon), 290.
caribæum (Branchiostoma), 514.
carinatum(Acanthosoma), 318.

carinatum (Stegost.), 409.
carinatus (Diodon), 318.
carnea (Trygon), 480.
carolinensis(Balistes),217.
carpinus (Balistes), 211.
caryi (Acipenser), 333.
caryi (Antaceus), 333.
cassini (Muræna), 41.
castaneus (Balistes), 217.
castaneus (Ichthyomyzon), 507.
Cataphractus, 147.
cataphractus (Acipenser), 345.
cataphractus (Scaphirhynchus), 345.
catenata (Echidna), 131.
catenata (Muræna), 96, 106, 130.
catenatus (Gymnothorax), 131.
catenatus (Pœcilophis), 131.
catenula (Murenophis), 131.
Catophorhynque, 271.
catulus (Scylliorhinus), 402.
catulus (Squalus), 401, 402, 406.
caudacinctus (Anchisomus), 303.
caudacinctus (Psilonotus), 303.
caudacinctus (Tetrodon), 303.
caudata (Lamna), 363.
caudatus (Doryichthys), 182.
caudatus (Microphis), 182.
caudatus (Ophisurus), 77.
caudatus (Squalus), 412.
caudofasciatus(Tetrodon), 304.
caudolimbatus (Echelus), 40.
celebesensis (Anguilla),36.
celebicus (Ophichthys),61.
celebicus (Ophisurus), 61.
cemiculus (Rhinobatus), 444.
Centrina, 417.
centrina (Acanthorhinus), 417.
centrina (Callorhynchus), 349.
centrina (Oxynotus), 417.
centrina (Squalus), 417.
Centrophorus, 419.
Centroscyllium, 425.
Centroscymnus, 419, 423.
centroura (Raja), 476.
Centrurophis, 54.
cepedianus (Galeus), 377.
cephalopeltis (Sphagebranchus), 55.
Cephaloptera, 496.
cephaloptera (Raja), 496.
Cephaloscyllium, 400.
cephalozona(Ophichthys), 69.
Cephalus, 317.
ceramensis (Gymnothorax), 118.
ceramensis (Leptocephalus), 143.
ceramensis (Muræna), 118.
ceramensis (Thyrsoidea), 118.
Ceratacanthus, 229.
Ceratoptera, 497.
Ceratopterina, 496.
cerino-nigra (Muræna), 94.
Cestracion, 380, 415.
Cestraciontidæ, 415.
Cestrorhinus, 380.
cetaceus (Squalus), 394.
ceylonensis (Syngnathus), 168.
Chænogaleus, 375.
Chætodermis, 229.
Chagreen Ray, 468.
chagrinea (Raja), 467.
Channomuræna, 133, 134.
chantenay (Raja), 455.
Chapin, 256.
Chat rochier, 403.
Cheilichthys, 271, 282.
Cheilobranchus, 17.
Cheilonodon, 271, 288.
cheilopogon (Ophisurus), 76.
Chifis, 330.
chilense (Scyllium), 405.
chilensis (Geotria), 509.
chilensis (Raja), 455.
chilensis (Torpedo), 448.
chilensis (Velasia), 509.
Chilobranchina, 17.
Chilobranchus, 17.
Chilomycterus, 309.
chilopogon (Cirrhimuræna), 76.
chilopogon (Ophichthys), 76.
Chilopterus, 500.
Chilorhinus, 51.
Chiloscyllium, 410.
chilospilus (Gymnothorax), 117.
Chimæra, 349.
Chimæridæ, 349.
chinensis (Balistes), 236.
chinensis(Cirrhimuræna), 75.
chinensis (Hippocampus), 204.
chinensis (Monacanthus), 236, 237.
chinensis (Ophichthys), 75.
chinensis (Raja), 455, 471.
chinensis (Syngnathus), 167.
chlorostigma (Gymnothorax), 100.
chlorostigma (Thyrsoidea), 100.
chœrocephalus (Monacanthus), 242.
Chœroichthys, 179.
choirocephalus (Paramonacanthus), 242.
Chondropterygii, 348.
Chondrostei, 332.
Chonerhinus, 270.
chrysops (Muræna), 94.
chrysops (Ophisurus), 60.
chrysopterus (Balistes), 218.
chrysospilos (Ophisurus), 69.
chrysospilus (Balistes), 222.
chrysospilus (Monacanthus), 233.
cibarius (Ammocœtes), 505.
Cibotion, 256.
cicatricosus(Balistes),221.
ciliaris (Balistes), 216.
ciliatus (Petromyzon), 506.
cincinnati (Acipenser), 339.
cincinnati (Antaceus),339.
cinctus (Balistapus), 225.
cinctus (Balistes), 225.
cinerascens (Muræna), 123.
cinerea (Alutera), 251.
cinerea (Amia), 325.
cinerea (Muræna), 46.
cinereus (Balistes), 226.
cinereus (Conger), 38.
cinereus (Heptanchus), 398.
cinereus (Monopterhinus), 398.

cinereus (Monopterus), 14.
cinereus (Murænesox), 46.
cinereus (Notidanus), 398.
cinereus (Squalus), 398.
circularis (Raja), 462.
cirratum (Ginglymostoma), 408.
cirratus (Pristiophorus), 432, 433.
cirratus (Pristis), 432.
cirratus (Squalus), 407.
cirrhatum (Bdellostoma), 511.
cirrhatum (Heptatrema), 512.
cirrhatus (Petromyzon), 511.
Cirrhimuræna, 54.
cirrifer (Monacanthus), 239.
cirrocheilus (Ophisurus), 65.
cirrochilus (Brachysomophis), 65.
cirrochilus (Ophichthys), 65.
Cirrostomi, 513.
cirrosus (Squalus), 409.
citrinellus (Tetrodon), 293
clathrata (Anguilla), 23.
clavata (Dasybatis), 456.
clavata (Raja), 456, 460.
cocherani (Cephalus), 320.
cochinchinensis (Crayracion), 271.
cochinensis (Crayracion), 292.
Cocuyo, 221.
cœlolepis (Centrophorus), 423.
cœlolepis (Centroscymnus), 423.
Cœlonotus, 188.
colliei (Chimæra), 350.
colliei (Hydrolagus), 350.
colubrina (Muræna), 81, 104.
colubrina (Ophithorax), 81.
colubrina (Thyrsoidea), 104.
colubrinus (Gymnothorax), 81.
colubrinus (Liuranus), 54.
colubrinus (Ophichthys), 81.
colubrinus (Ophisurus), 81.
columnæ (Rhinobatus), 446.
columnæ (Syrrhina), 446.
comes (Hippocampus), 202, 204.
commersonii (Tetrodon), 294.
communis (Conger), 39.
communis (Galeus), 379.
compar (Cœcilophis), 70.
compar (Ophisurus), 70.
compressus (Myroconger), 93.
compressus (Tetraodon), 304.
concatenatus (Ostracion), 259.
concolor (Ammocœtes), 500.
concolor (Ginglymostoma), 408, 409.
concolor (Gymnomuræna), 134.
concolor (Nebrius), 409.
concolor (Thyrsoidea), 94.
concolor (Uropteryguis), 134.
Conger, 37.
conger (Anguilla), 39.
conger (Muræna), 38.
Congermuræna, 40.
congeroides (Muræna), 127.
Congromuræna, 40.
conspersa (Muræna), 102.
conspersus (Gymnothorax), 102.
conspicillatus (Halicampus), 169.
conspicillatus (Syngnathus), 174.
conspicillum (Balistapus), 220.
conspicillum (Balistes), 214, 220.
convexifrons (Aluterus), 252.
convexifrons (Monacanthus), 252.
convexirostris (Monacanthus), 248.
cooperi (Raja), 455.
cormura, 124.
cornubica (Lamna), 389, 518.
cornubicus (Carcharinus), 390.
cornubicus (Isurus), 390.
cornubicus (Squalus), 389.
Cornuda, 381.
cornuta (Myliobatis), 490.
cornutum (Ostrac.), 265.
cornutus (Acanthostracion), 264.
cornutus (Ciclichthys), 310.
cornutus (Ostracion), 264, 265.
coronata (Pisoodonophis), 82.
coronatus (Hippocampus), 205.
Corythoichthys, 155.
costai (Esunculus), 145.
crassus (Lepisosteus), 330.
crebripunctata (Pteroplatea), 486.
crepidalbus (Centrophorus), 423.
crepidater (Centrophorus), 421.
crinitus (Syngnathus), 166.
cristata (Chimæra), 349.
cristini (Muræna), 125.
crocodilinus (Ophichthys), 64.
crocodilinus (Ophisurus), 64.
Crossorhinus, 413.
Crotalopsis, 54.
crozieri (Trygon), 481.
cruciata (Raja), 485.
cruciatus (Urolophus), 485.
crudelis (Eurymyctera), 127.
cryptodon (Monacanthus), 233.
cryptodon (Paramonacanthus), 233.
cubana (Anguilla), 31.
cubensis (Channomuræna), 135.
cubicus (Ostracion), 260.
cuchia (Amphipnous), 13.
cuchia (Unibranchapertura), 13.
cucuri (Prionodon), 373.
cultifrons (Aluteres), 254.
cultirostris (Trachyramphus), 167.
cuncalus, 181.
curassavicus (Balistes), 221.
curtorhynchus (Monacanthus), 234.
curtorhynchus (Paramonacanthus), 234.
curvidens (Congrus), 47.
curvilineata (Murenophis), 120.
curvus (Tetrodon), 274.
cuspicauda (Aluteres), 229.
cuspicauda (Balistes), 229.

cuspidatus (Pristis), 439.
cutaneus (Tetrodon), 287.
cutcutia (Tetrodon), 290.
cuvier (Squalus), 401.
cuvieri (Anguilla), 29.
cuvieri (Syngnathus), 157.
cuvieria (Raja), 456.
Cyanichthys, 309.
cyanopterum (Solenostoma), 151.
cyanospilus(Syngnathus), 170.
cyanurus (Ostracion), 260.
Cyclichthys, 309.
Cyclostomata, 499.
cylindroideus (Conger), 51.
cylindroideus (Paramyrus), 51.
Cylindrosteus, 328.
Cynocephalus, 363.
Cynoponticus, 45.

dabryanus (Acipenser), 333.
dactyliophorus (Syngnathus), 186.
dactylophorus (Doryichthys), 186.
dadong (Trygon), 475.
dasypogon(Crossorhinus), 414.
dauricus (Acipenser), 333.
deanei (Hippocampus), 203.
dekayi (Isuropsis), 391.
delalandii (Anguilla), 33.
delalandi (Syngnathus), 157.
delarochianus (Scylliorhinus), 407.
delicatula (Echidna), 132.
delicatulus (Pœcilophis), 132.
delle Chiaje (Helminthostoma), 145.
dentex (Leptocephalus, 142.
deocata (Syngnathus), 179.
deokhatoides, 180.
Dermatostethus, 156.
Dermopteri, 499.
desmarestia (Raja), 455.
Diabolichthys, 498.
diabolus (Cephaloptera), 498.
diabolus (Raja), 496.
diadematus (Tetraodon), 293.
Diaphanichthys, 142.
diaphanus(Helmichthys), 141.
diaphanus (Lætophrys), 264.
diaphanus (Leptocephalus), 142.
diaphanus (Ostracion), 264.
diaphanus (Raja), 462.
dicellurus (Ophichthys), 59.
dicellurus (Ophisurus), 59.
Dicerobatis, 496.
Dicotylichthys, 314.
dieffenbachii (Anguilla), 32.
diepenhorsti (Ophichthys), 70.
diepenhorsti (Ophisurus), 70.
Dilobomyctère, 271.
dimidiatus (Syngnathus), 165.
Diodon, 306.
Diodon, oblong, 319.
Diodon, short, 317.
Diplanchias, 317.
diplodon (Muræna), 118.
Dipnoi, 321.
dipterygia (Astrape), 454.
dipterygia (Narcine), 454.
dipterygia (Raja), 454.
dipterygia (Torpedo), 454.
Discopyge, 453.
dissutidens (Tetrodon), 289.
diversicolor (Torpedo), 450.
dizona (Muræna), 129.
djarong (Syngnathus), 172.
djeddensis (Rhinobatus), 441.
djeddensis (Rhynchobatus), 441.
djiddensis (Raja), 441.
Dog-fish, black-mouthed, 407.
Dog-fish, large spotted, 403.
Dog-fish, lesser spotted, 402.
Dog-fish, pricked, 418.
doliata (Gymnomuræna), 129.
dombey(Gastrobranchus), 512.
Dondoo Paum, 13.
donensis (Acipenser), 340.
dorsalis (Chilobranchus), 19.
dorsalis (Mustilus), 387.
dorsovittatus (Arothron), 299.
Doryichthys, 179.
Doryrhamphus, 179.
dovii (Muræna), 103.
draco (Cataphractus), 147.
draco (Pegasus), 147.
dromicus (Ophichthys), 80.
dubius (Pristis), 438.
duhameli (Rhinobatus), 441.
duivenbodei (Gymnothorax), 114.
duivenbodii (Muræna), 114.
dumerilii (Carcharias), 359.
dumerilii (Centrophorus), 422.
dumerilii (Doryichthys), 185.
dumerilii (Machephilus), 422.
dumerilii (Monacanthus), 229.
dumerilii (Nerophis), 191.
dumerilii (Rhina), 431.
dumerilii(Scoliodon), 359.
dumerilii (Squatina), 431.
dumerilii (Tæniura), 484.
dussumierii(Anguilla), 37.
dussumieri (Carcharias), 367.
dussumieri (Leptocephalus), 144.
dussumieri (Prionodon), 367.

Écailleux, 422.
Echidna, 93.
echidna (Gymnothorax), 130.
echinatum (Leiodon), 427.
echinatus(Chilomycterus) 312.
echinatus (Holocanthus), 312.
Echinorhinus, 428.
Echiopsis, 54.
edentula (Platirostra), 346.
edentulus (Squalus), 496.
edwardsii (Scyllium), 401.
Eel, 28.
eeltenkee (Myliobatis), 492.
eglanteria (Raja), 462.

ehrenbergii (Ceratoptera), 498.
elaborata (Muræna), 101.
Elapsopis, 54.
Electric Eel, 10.
electricus (Gymnotus), 10.
electricus (Rhinobatus), 444.
electricus (Tetrodon), 300.
Electrophorus, 10.
elegans (Orthragoriscus), 320.
elegans (Squalus), 402.
elegantissima (Muræna), 111.
elephantinus (Callorhynchus), 351.
elephas (Squalus), 394.
Elipesurus, 472.
ellioti (Trygon), 473.
elliotti (Diabolichthys), 498.
Ellipesurus, 472.
elongatum (Branchiostoma), 514.
elongatus (Balistes), 211.
elongatus (Cephalus).320.
elphinstonei (Anguilla), 27.
elucens (Syngnathus), 165.
emarginata (Torpedo), 449.
Enchelycore, 135.
Enchelynassa, 136.
endlicheri (Polypterus), 326.
Endormie, 440.
Entosphenus, 506.
Entoxychirus, 418.
ephippiatus (Urolophus), 485.
episcopus (Myliobatis), 490.
eques (Phyllopteryx), 197.
equestris (Balistes), 215.
equestris (Mustelus), 385.
erebus (Muræna), 94.
eregoodoo, 497.
erinaceus (Hippocampus), 206.
erinaceus (Raja), 462.
erinaceus (Trichocyclus), 316.
Erizo, 306.
Erpetoichthys, 327.
erythreus (Ptyobranchus), 90.
Erythrodon, 212, 228.
erythrodon (Balistes), 228.
erythropteron (Balistes), 225.
erythrotænia (Crayracion), 298.
erythrotænia (Tetrodon), 298.
esculentus (Conger), 39.
Esturgeon, 342.
Esunculus, 145.
ethon (Syngnathus), 165.
Eulamia, 363.
Euprotomicrus, 427.
euptera (Muræna), 122.
eurosta (Thyrsoidea), 94.
eurychasma (Synbranchus), 14.
eurylæma (Anguilla), 23.
Eurymyctera, 93.
euryrhina (Enchelycore), 135.
eurystoma (Anguilla), 23.
Eusphyra, 380.
excisus (Doryichthys), 186.
excisus (Doryrhamphus), 186.
exodentata (Murænesox), 45.
exodon (Murænesox). 45.

fabricii (Centroscyllium), 425.
fabricii (Spinax), 425.
fabroniana (Cephaloptera), 496.
fabroniana (Raja), 496.
fahaka (Tetrodon), 290.
falciformis (Carcharias), 363.
falciformis (Prionodon), 363.
falcipinnis (Carcharias), 366.
falsavela (Raja), 462.
fasciata (Anguilla), 23.
fasciata (Gymnomuræna), 129.
fasciata (Muræna), 81.
fasciata (Raja), 491.
fasciata (Trygonorhina), 448.
fasciatum (Stegostoma), 409.
fasciatus (Carapus), 9.
fasciatus (Carcharias), 368.
fasciatus (Congrus), 37.
fasciatus (Corythoichthys), 174.
fasciatus (Gymnothorax), 81.
fasciatus (Gymnotus), 9.
fasciatus (Ophisurus), 81
fasciatus (Orthagoriscus), 317.
fasciatus (Pisoodonophis), 81.
fasciatus (Prionodon), 368.
fasciatus (Scyphius), 192.
fasciatus (Squalus), 409.
fasciatus (Syngnathus), 157, 163, 174, 192.
fasciatus (Tetrodon), 279.
fascicularis (Hippocampus), 198.
fascigula (Muræna), 132.
favaginea (Muræna), 106.
favagineus (Gymnothorax), 106.
felis (Mustelus), 384.
fernandezianus (Spinax), 418.
fernandinus (Squalus), 418.
ferox (Carcharias), 393.
ferox (Cynoponticus), 47.
ferox (Leius), 429.
ferox (Lepisosteus), 329.
ferox (Odontaspis), 393.
ferox (Squalus), 393.
ferrugineum (Scyllium), 408.
ferrugineus (Syngnathus), 157.
fidjiensis (Anguilla), 26.
filamentosus (Monacanthus), 239.
File-fish, 217.
filum (Ichthyocampus), 178.
fimbriata (Muræna), 108.
fimbriata (Raja), 498.
fimbriata (Squatina), 431.
firmamentum (Tetrodon), 299.
fissidens (Carcharias), 365.
fistularius (Leptoichthys), 187.
fistulatus (Syngnathus), 161.
flagellum (Aëtobatis), 492.
flagellum (Goniobatis), 492.
flagellum (Raja), 492.
flagellum (Saccopharynx), 22.
flaveola (Murænophis), 94.
flavescens (Syngnathus), 175.
flavigaster (Aracana), 267.

flavigaster (Ostracion), 267,
flavimarginatus (Balistes), 223, 517.
flavipinnatus (Conger), 78.
flavofasciata (Echidna), 131.
flavofasciatus (Syngnathus), 156.
flavomarginata (Muræna), 94, 119.
flavomarginatus (Gymnothorax), 120,
flavomarginatus (Pseudobalistes), 223.
flavopicta (Muræna), 101.
flavopicta (Thyrsoidea), 101.
floresiana (Muræna), 118.
floresianus (Gymnothorax), 118.
flossada (Raja), 467.
Fluta, 14.
fluviatilis (Anguilla), 29.
fluviatilis (Crayracion), 299.
fluviatilis (Lampetra), 503.
fluviatilis (Petromyzon), 502.
fluviatilis (Tetrodon), 299.
fobinii (Ostracion), 267.
foliatus (Phyllopteryx), 196.
foliatus (Syngn.), 196.
folium (Polyodon), 346.
forcipatus (Balistes), 216, 516.
formosa (Muræna), 111.
formosus (Gymnothorax), 111.
formosus (Tetrodon), 283.
fornasini (Acanthostracion), 264.
fornasini (Lætophrys), 264.
fornasini (Ostracion), 264.
forskalii (Trygon), 482.
forsterii (Bdellostoma), 512.
Fox, 393.
francisci (Cestracion), 416.
francisci (Gyropleurodus) 416.
frauenfeldii (Monacanthus), 244.
freminvillii (Myliobatis), 488.
frenatus (Balistapus), 219
frenatus (Balistes), 218.
frenatus (Monacanthus), 241.
freycineti (Balistes), 229.
freycineti (Monacanthus), 229.
freycineti (Scyllium), 411.
fronticinctus (Monacanthus), 231.
fucicola (Syngnathus), 155.
fulgens (Squalus), 429.
fuliginosus (Balistes), 217.
fuliginosus (Diodon), 310.
fuliginosus (Synbranchus), 15.
Fuller Ray, 458.
fullonica (Raja), 460, 467.
fulva (Muræna), 94.
fulvum (Ginglymostoma), 408.
funebris (Gymnothorax), 123, 124.
fusca (Gymnomuræna), 134.
fusca (Muræna), 85.
fuscomaculata (Echidna), 131.
fuscomaculata (Torpedo), 451.
fuscus (Balistes), 222.
fuscus (Hippocampus), 198.
fuscus (Ophichthys), 85.
fuscus (Syngnathus), 157.

gaimardi (Raja), 468.
Galafete, 227.
galeatus (Cestracion), 416.
Galeocerdo, 377.
Galeus 379.
galeus (Carcharias), 379.
galeus (Squalus), 379.
gallinula (Monacanthus), 239.
galvanii (Torpedo), 450.
gangeticus (Carcharias), 367.
gangeticus (Prionodon), 367.
Ganoidei, 324.
garapa (Trygon), 482.
Gasterotokeus, 194.
Gastrobranchus, 510.
Gastrophysus, 271, 273.
gastrotænia (Corythoichthys), 173.
gastrotænia (Syngnathus), 172, 173.
Gastrotokeus, 194.
Gata, 408.
Gatte, 425.
gavialis (Lepisosteus), 330.
gegenbauri (Leptocephalus, 140.
gegenbauri (Tilurus), 144.
Geneion, 271.
geographicus (Monacanthus), 236.
geometrica (Muræna), 119.
geometricus (Anchisomus), 283.
geometricus (Chilomycterus), 310.
geometricus (Diodon), 310.
geometricus (Tetrodon), 282, 283.
Geotria, 508.
gerrardi (Trygon), 474.
gesneri (Raja), 477.
ghini (Orthragoriscus), 318.
gibbosus (Ostracion), 258.
Ginglymostoma, 407.
giorna (Cephalopterus), 496, 498.
giorna (Raja), 496.
giornæ (Dicerobatis), 496.
glaber (Acipenser), 335.
glaber (Antaceus), 335.
glacialis (Scymnus), 427.
gladius (Polyodon), 347.
glauca (Lamna), 391.
glauca (Oxyrhina), 391.
glaucostictus (Rhinobatus), 444.
glaucus (Carcharias), 364.
glaucus (Carcharinus), 365.
glaucus (Galeus), 364.
glaucus (Prionodon), 365.
glaucus (Squalus), 364, 390.
Globe-fish, 282.
glutinosa (Myxine), 510.
Glutinous Hag, 511.
Gluts, 32.
glyphis (Carcharias), 373.
glyphis (Prionodon), 373.
gmelini (Acipenser), 335.
Gnathophis, 40, 43.
gomesii (Leptorhinophis), 60.
gomesii (Ophichthys), 60.
gomesii (Ophisurus), 60.
gomphodon (Oxyrhina), 391.
Goniodus, 428.
grabata (Tæniura), 484.
grabatus (Trygon), 484.
gracilis (Hippocampus), 198.
gracilis (Lepisosteus), 330.

gracilis (Leptocephalus), 141.
gracilis (Muræna), 113.
gracilis (Ophichthys), 90.
gracilis (Ophisuraphis), 90
gracilis (Ptyobranchus), 90.
gracilissimus (Hippocampus), 198.
gracillima (Acentronura), 198.
grammatocephalus (Tetraodon), 271.
grammicus (Synbranchus), 14.
grandimaculata (Ophichthys), 58.
grandispina (Tetrodon), 271.
grandoculis (Ophichthys), 71.
grandoculis (Ophisurus) 71.
granulata (Balistes), 243.
granulatus (Monacanthus), 243.
granulatus (Rhinobatus), 443.
granulosa (Pristis), 438.
granulosa (Raja), 467.
granulosus (Acanthorhinus), 420.
granulosus (Balistes), 236.
granulosus (Centrophorus), 420.
granulosus (Monacanthus), 243.
granulosus (Squalus), 420.
grayi (Acerana), 268.
grayi (Anoplocapros), 268.
grayii (Halicampus), 169.
grayi (Lepisosteus), 329.
grayi (Syngnathus), 169.
Grigs, 32.
grisea (Muræna), 118.
grisea (Murænophis), 119.
grisea (Thyrsoidea), 119.
grisea (Unibranchapertura), 15.
griseobadia (Muræna), 113.
griseobadia (Thyrsoidea), 113.
griseobadius (Gymnothorax), 114.
griseolineatus (Syngnathus), 160.
Griset, 397.
griseum (Chiloscyll.), 412.
griseus (Carcharias), 390, 518.
griseus (Hexanchus), 397.
griseus (Monopterhinus), 397.
griseus (Notidanus), 397.
griseus (Squalus), 397.
gronovianus (Squalus), 411.
gronovii (Ostracion), 258.
Grynzert, 230.
Guamajacu atinga, 310.
Guaperva, 215.
Guaperva hystrix, 232.
Guaperva longa, 213.
guichenoti (Callechelys), 88.
guineensis (Ostracion), 258.
gularis (Tetrodon), 290.
güldenstädtii (Acipenser), 340.
gunneri (Cetorhinus), 394.
gunneri (Scymnus), 427.
gunneri (Squalus), 424.
gunnii (Monacanthus), 247.
güntheriana (Alutera), 251.
gussoni (Leptocephalus), 139.
guthrianus (Ptyobranchus), 90.
guttata (Limamuræna), 97
guttata (Muræna), 96, 97.
guttata (Raja), 472, 492.
guttifer (Tetrodon), 272.
guttulatus (Hippocampus), 202.
guttulatus (Pisoodonophis), 83.
gutturalis (Symbranchus), 17.
gutturosus (Balistes), 211.
Gymnodontes, 269.
Gymnomuræna, 93, 133.
gymnopterus (Muræna), 52.
gymnopterus (Murænichthys), 52.
Gymnothorax, 93.
Gymnotidæ, 1.
Gymnotini, 1.
Gymnotus, 10.
gymnotus (Murænichthys), 53.
gymnura (Trygon), 480.
Gyropleurodus, 415.

Haae-Gjäle, 406.
Haa-Skierding, 426.
habenata (Congromuræna), 42.
habenatus (Congrus), 42.
habenatus (Ophisoma), 42.
Habrand, 389.
hæckeli (Leptocephalus), 141, 142.
hæmatopterus (Syngnathus), 174.
hajam (Monacanthus), 238.
Halælurus, 400.
halavi, 442.
halgani (Trygon), 483.
Halicampus, 155.
Haliichthys, 197.
halleri (Urolophus), 485.
hallowellii (Acipenser), 343.
hallowellii (Antaceus) 343.
halmaherensis (Muræna), 23.
hamiltonii (Murænesox), 46.
hamiltonii (Rataboura), 90.
hamiltonii (Tetrodon), 280.
hamo (Conger), 46.
harancha (Ophisurus), 61, 77.
hardwickii (Rataboura), 90.
hardwickii (Solenognathus), 195.
hardwickii (Syngnathus), 195.
hardwickii (Temera), 455.
hartlaubii (Tetraodon), 278.
hasseltii (Doryichthys), 184.
hasseltii (Scyllium), 412.
hastata (Pastinaca), 476.
hastata (Trygon), 476.
Hausen, 337.
haüy (Murænophis), 94.
havanensis (Ophis.), 67.
havanensis (Uranichthys), 67.
havannensis (Muræna), 67.
havannensis (Ophichthys), 67.
hebetans (Torpedo), 449, 450.
heckeli (Nerophis), 192.
heckelii (Acipenser), 341, 517.
helena (Muræna), 96, 98.
helena (Murænophis), 96.

helfrichii (Syngnathus), 172.
helleri (Monacanthus), 238.
Helmichthys, 136.
Helminthostoma, 145.
Helops, 333.
helops (Acipenser), 340.
helvolus (Monopterus), 14.
Hemiconiatus, 272.
Hemigaleus, 375.
hemiodon (Carcharias), 362.
hemiodon (Hypoprion), 362.
hemiodon (Hypoprionodon), 362.
Hemiscyllium, 410.
Hemithylacus, 188.
Hemitrygon, 472.
henlei (Carcharias), 363, 365.
henlei (Prionodon), 363, 365, 370.
henlei (Rhinotriacis), 384.
henlei (Tæniura), 484.
henlei (Trygonoptera), 486.
hepatica (Muræna), 122.
hepaticus (Ophisternon), 16.
heptagonum (Scyllium), 409.
heptagonus (Hippichthys), 173.
heptagonus (Syngnathus), 173.
Heptanchus, 397, 398.
Heptatrema, 511.
heptatrema (Bdellostoma), 512.
heraldi (Tetrodon), 283.
Herpetoichthys, 54.
heteracanthus (Balistes), 211.
Heteroconger, 44.
Heterocongrina, 44.
Heterodontus, 415.
heterognathus (Myrophis), 43.
heterosoma (Doryichthys), 180.
heterosoma (Syngnathus), 180.
heterotrema (Bdellostoma), 512.
heterurus (Trygon), 475.
heudelotii (Aluterus), 251.
heudelotii (Monacanthus), 251.
hexagonus (Ostracion), 266.
Hexanchus, 397.
hexatrema (Bdellostoma), 512.
hibernica (Anguilla), 29.
hihpe (Balistes), 219.
hillianus (Spinax), 425.
Himantura, 472.
hinnulus (Galeorhinus), 386.
hinnulus (Galeus), 385.
Hippichthys, 173.
Hippocampina, 194.
Hippocampus, 198.
Hippocampus (Short-snouted), 199.
hippocampus (Syngnathus), 198, 200.
hippocrepis (Balistes), 246.
hippocrepis (Monacanthus), 246.
hirudo (Ichthyomyzon), 507.
hirundinaceus (Carcharias), 365.
hirundinaceus (Prionodon), 365.
hirundo (Pteroplatea), 487.
hispanus (Ophichthys), 72.
hispanus (Ophisurus), 72.
hispidus (Balistes), 233.
hispidus (Orthragoriscus), 318.
hispidus (Tetrodon), 297.
histrix (Hippocampus), 206.
hoevenii (Ophichthys), 79.
hoevenii (Ophisurus), 79.
hoevenii (Pisoodonophis), 79.
Holacanthus, 271.
holbrookii (Aluteres), 229.
hollardi (Hollardia), 209.
Hollardia, 209.
holocanthus (Diodon), 309.
Holocephala, 348.
Holostei, 324.
Homelyn Ray, 458.
homianus (Cetorhinus), 394.
honckenii (Gastrophysus), 276.
honckenii (Tetrodon), 276.
hookeri (Prymnothonus), 145.
Hoornvisch, 209.
Hoplunnis, 49.
horkelii (Rhinobatus), 444.
horridus (Brachysomophis), 64.
hospitus (Acipenser), 342.
Hound, Smooth, 386.
houttuyni (Monacanthus), 231.
hudsonius (Hippocampus), 198.
humantin (Centrina), 417.
humboldtii (Pastinaca), 483.
hunnii (Syngnathus), 172.
huronensis (Lepisosteus), 330.
Huso, 333.
huso (Acipenser), 336, 337.
hyala (Ophichthys), 60.
hyala (Ophisurus), 60.
hyala (Ophiurus), 61.
hyalinus (Oxystomus), 144.
hymenolomus, 194.
hynnicephalus (Rhinobatus), 446.
Hyoprorus, 48, 144.
Hypnos, 453.
Hypolophus, 472, 482.
Hypoprion, 362.
Hypoprionodon, 362.
hypostomus (Cephalopterus), 497.
hypselogenion (Tetrodon), 277.
hypselopterus (Ophichthys), 79.
hypselopterus (Ophisurus), 79.
hypselopterus (Pisoodonophis), 79.
hypselosoma (Leptocephalus), 140.
hystrix (Amanses), 232.
hystrix (Diodon), 306.
hystrix (Hippocampus), 206.
hystrix (Holocanthus), 306.
hystrix (Monacanthus), 232.
hystrix (Paradiodon), 306.
hystrix (Trygon), 482.

Ichthyapus, 54.
Ichthyocampus, 173, 176.
Ichthyocolla, 337.
Ichthyomyzon, 506.
Ichthyophis, 133.
imberbis (Ophichthys), 84.

imberbis (Sphagebranchus), 84.
imbricata (Raja), 481.
imbricata (Trygon) 475, 481.
immaculata (Apterigia), 15.
immaculata (Unibranchapertura), 15.
immaculatus (Arothron), 291.
immaculatus (Crayracion), 291.
immaculatus (Ostracion), 260.
immaculatus (Symbranchus), 15, 17.
immaculatus (Tetrodon), 291.
implutus (Crayracion), 297.
implutus (Tetrodon), 297.
impressus (Conger), 41.
impressus (Ophisoma), 41.
inæquilabiatus (Carapus), 9.
indica (Narcine), 452.
indicum (Chiloscyllium), 411.
indicus (Heptanchus), 398.
indicus (Notidanus), 398.
indicus (Squalus), 411.
inermis (Tetrodon), 274.
infernalis (Gymnothorax), 123.
infernalis (Muræna), 123.
infernus (Acanthorhinus), 419.
infernus (Squalus), 419.
ingens (Hippocampus), 198.
insignitus (Tetrodon), 300.
intermedia (Raja), 464.
intermedius (Syngnathus), 168.
intermedius (Trachyrhamphus), 168.
interrupta (Muræna), 105.
intertinctus (Echiopsis), 57.
intertinctus (Ophichthys), 57.
intertinctus (Ophisurus), 57.
irregularis (Muræna), 115.
irregularis (Thyrsoidea), 115.
irroratus (Monacanthus), 231.
isingleena (Muræna), 108.
isingleena (Thyrsoidea), 107.
isingleenoides (Gymnothorax), 108.
isingleenoides (Muræna), 108.
isingteena (Gymnothorax), 107.
isingteena (Muræna), 106.
Isistius, 429.
isodon (Aprion), 361.
isodon (Aprionodon), 361.
isodon (Carcharias), 361.
isodus (Squalus), 394.
Isogomphodon, 363.
isogramma (Monacanthus), 239.
Isoplagiodon, 363.

jabebara (Trygon), 472.
Jabebirete, 472.
jacksonianus (Balistes), 211.
jacksoniensis (Gymnothorax), 123.
jaculiferus (Chilomycterus), 313.
jaculiferus (Diodon), 313.
jagorii (Microphis), 179.
jamaicensis (Raja), 485.
janthinopterus (Anosmius), 302.
janthinopterus (Canthogaster), 302.
janthinopterus (Psilonotus), 302.
janthinopterus (Tetrodon), 302.
janthinopterus (Tropidichthys), 302.
janthinosoma (Monacanthus), 242.
japonica (Anguilla), 31.
japonica (Astrape), 454.
japonica (Cephaloptera), 496.
japonica (Dicerobatis), 496.
japonica (Pteroplatea), 487.
japonica (Squatina), 431.
japonicus (Carcharias), 367.
japonicus (Galeus), 380.
japonicus (Hippocampus), 200.
japonicus (Petromyzon), 504.
japonicus (Prionodon), 367.
japonicus (Pristiophorus), 433.
jaram (Rhinobatus), 441.
javanensis (Monopterus), 14.
javanica (Moringua), 92.
javanica (Muræna), 119.
javanica (Rhinoptera), 494.
javanica (Trygonoptera), 486.
javanicus (Aphthalmichthys), 92.
javanicus (Carcharias) 367.
javanicus (Gymnothorax), 120.
javanicus (Monopterus), 14.
javanicus (Urolophus), 486.
johannæ (Anguilla), 25.
johnii (Ceratoptera), 498.
jojenia (Raja), 455.
juræ (Petromyzon), 503.
jussieui (Myliobatis), 493.
jussieui (Rhinoptera), 493.
jussieui (Zygobatis), 493.

kamensis (Acipenser), 335.
kampylotrachelos (Hippocampus), 204.
Kappa, 288, 291.
kappa (Tetrodon), 289.
kaupi (Ophichthys), 86.
kaupi (Sphagebranchus), 86.
kaupii (Synaphobranchus), 23.
kaupii (Syngnathus), 174.
kaupii (Thyrsoidea), 94.
kefersteinii (Leptocephalus), 142.
kenojei (Raja), 461.
Kentrocapros, 266.
kidako (Muræna), 117.
kieneri (Anguilla), 35.
kirkii (Ophichthys), 89.
kleinii (Balistes), 251.
knerii (Monacanthus), 246
knerii (Paramonacanthus) 246.
koilomatodon (Syngnathus), 169.
kölliкeri (Leptocephalus), 140.
Koma sorra, 381.
komuki (Monacanthus), 240.
Kostera, 335.
kuda (Hippocampus), 202
kuhlii (Cephaloptera), 497.
kuhlii (Dicerobatis), 497.

kuhlii (Polyuranodon), 114.
kuhlii (Syngnathus), 170.
kuhlii (Trygon), 479.
kunhardti (Tetrodon), 291.
kunsul (Pastinaca), 487.

labiata (Anguilla), 26.
labordii (Euprotomicrus), 428.
labordii (Læmargus), 428.
labrosa (Anguilla), 25.
lacepedii (Leiuranus), 54.
lacepedii (Sternarchus), 2.
lacrymatus (Tetrodon), 299.
Lactophrys, 258.
Læmargus, 426.
Lætophrys, 255.
lævicaudatus (Hippocampus), 205.
lævigatus (Gastrophysus), 274.
lævigatus (Tetrodon), 273, 274.
Læviraja, 466.
lævis (Acipenser), 333.
lævis (Alutarius), 252.
lævis (Balistes), 252.
lævis (Galeus), 385.
lævis (Monopterus), 14.
lævis (Mustelus), 385.
lævis (Pastinaca), 478.
lævis (Raja), 456.
lævis (Rhinobatus), 441.
lævis (Rhynchobatus), 441.
lævis (Squatina), 430.
lævis (Synbranchus), 14.
lævis (Unibranchapertura, 14.
lagocephalus (Holocanthus), 276.
lagocephalus (Tetrodon), 273, 274.
lalandii (Carcharias), 360.
lalandii (Rhinoptera), 494.
lalandii (Scoliodon), 360.
lamia (Carcharias), 372.
lamia (Carcharinus), 390.
lamia (Carcharodon), 392.
lamia (Prionodon), 372.
lamia (Squalus), 390.
Lamiopsis, 363.
Lamna, 389.
Lamnidæ, 389.
Lamnina, 389.
Lamnostoma, 54.
lamottenii (Petromyzon), 500.
lamourouxii (Balistes), 226.
Lampern, 502.
Lampetra, 501.
lampetra (Petromyzon), 502.
Lamprillon, 504.
Lamproie, 501.
Lamproie du Java, 10.
Lamproyon, 504.
Lancelet, 513.
lanceolata (Muræenesox), 45.
lanceolatum (Branchiostoma), 513.
lanceolatus (Amphioxus), 513.
lanceolatus (Limax), 513.
lanceolatus (Orthagoriscus), 319.
lancifer (Pegasus), 149.
landbecki (Ammocœtes), 500.
lapicida (Caragola), 507.
lapradei, 517.
laterna (Crayracion), 297.
laterna (Tetrodon), 297.
laternarius (Pegasus), 148.
laticaudus (Carchar.), 358.
laticaudus (Scoliodon), 358.
laticeps (Aëtobatis), 492.
laticeps (Cephaloscyllium), 404.
laticeps (Scyllium), 404.
laticeps (Zygæna), 380.
latimaculatus (Ophisurus), 82.
latirostris (Acipenser), 342.
latirostris (Aëtobatis). 492.
latirostris (Anguilla), 29, 32.
latirostris (Cylindrosteus), 329.
latirostris (Lepisosteus), 329.
latirostris (Pegasus), 147.
lecomtei (Pœcilophis), 131.
lecomtii (Muræna), 131.
lecontei (Acipenser), 343.
lecontei (Antaceus), 343.
leeuwenii (Cestracion), 381.
leiaspis (Hemithylacus), 188.
leiaspis (Syngnathus), 188.
leiobatos (Raja), 464.
Leiodon, 272, 427.
leiogaster (Tetraodon), 291.
leionothos (Holocanthus), 282.
leiopleura (Tetrodon), 274.
Leiuranus, 54.
Leiurus, 212.
leiurus (Crayracion), 288.
Leius, 429.
lemprieri (Raja), 463.
lenticularis (Aracana), 268.
lenticularis (Ostracion), 268.
lentiginosa (Muræna), 99.
lentiginosus (Ostracion), 261.
Lepidosiren, 322.
Lepidosteidæ, 328.
Lepidosteus, 328.
leprosus (Pneumabranchus), 14.
Leptocarcharias, 384.
Leptocardii, 513.
Leptocarias, 384.
Leptocephalidæ, 136.
Leptocephalus, 139.
leptodon (Pristis), 437.
Leptognathus, 54.
leptognathus (Conger), 49.
leptognathus (Oxyconger), 49.
Leptoichthys, 187.
Leptorhinophis, 54.
Leptorhynchus, 21, 54.
leptorhynchus (Lepisosteus), 330.
leptorhynchus (Syngnathus), 160.
lepturus (Congrus), 44.
lepturus (Uroconger), 44.
lettiensis (Solenostomus), 516.
leucas (Carcharias), 368, 369.
leucas (Prionodon), 368.
leuchtenbergii (Belonopsis) 21.
leuchtenbergii (Leptorhynchus), 21.
leucophæus (Congrus), 39.
leucorhynchus (Rhinobatus), 444.
lewini (Zygæna), 381.
lewis (Squatina), 431.
liaspis (Cœlonotus), 188.
Libella, 381.
liberiensis (Balist.), 516.
Liche, 425.
lichia (Dalatias), 426.
lichia (Scymnus), 425, 426.
lichtensteinii (Acipenser), 342.

ichtensteinii (Hippocampus), 205.
ligonifer (Rhinobatus), 442.
Lija barbuda, 251.
Lija colorada, 231.
Lija trompa, 252.
lima (Balistes), 211.
lima (Raja), 455.
Limamuræna, 93.
limbatus (Carcharias), 373.
limbatus (Conger), 47.
limbatus (Prionodon), 373.
limosa (Myxine), 511.
linearis (Moringua), 91.
linearis (Porobronchus), 145.
lineata (Aracana), 267.
lineata (Murænophis), 94.
lineata (Ostracion), 267.
lineata (Unibranchapertura), 15.
lineatus (Arothron), 295.
lineatus (Balistapus), 226.
lineatus (Balistes), 226.
lineatus (Crayracion), 295.
lineatus (Doryichthys), 183.
lineatus (Lepisosteus), 330.
lineatus (Rhamphichthys), 6.
lineatus (Sternopygus), 7.
lineatus (Tetrodon), 290, 295.
lineo-guttatus (Monacanthus), 249.
lineolatus (Monacanthus), 229.
lineolatus (Tetraodon), 271.
lineopinnis (Muræna), 123.
lineopinnis (Thyrsoidea), 123.
lineopunctatus (Balistes), 221.
lineopunctatus (Leptocephalus), 143.
linguatula (Balistes), 251.
lingula (Narcine), 452.
lintea (Raja), 466.
lintiginosa (Amia), 325.
Liomonacanthus, 229.
Lioniscus, 333.
liopeltis (Acipenser), 341.
Liosaccus, 287.
lister (Ostracion), 257.
lita (Muræna), 116.
literata (Lycodontis), 112.
literata (Muræna), 113.
literata (Strophidon), 112.
littoralis (Eugomphodus), 392.
littoralis (Squalus), 392.
liturosus (Balistes), 253.
Liuranus, 54.
Liurus, 212.
iurus (Tetrodon), 288.
ividus (Petromyzon), 506.
lobatus (Squalus), 414.
longicaudata (Lycodontis), 126.
longicaudata (Strophidon), 126.
longicaudus (Dibolomycter), 291.
longicaudus (Squalus), 409.
longicollis (Muræna), 51.
longicollis (Myrophis), 51.
longimana (Eulamia), 372.
longimanus (Squalus), 372.
longipinnis (Ophichthys), 88.
longipinnis (Sphagebranchus), 88.
longirostratus (Gymnotus), 5.
longirostris (Balistes), 233.
longirostris (Conger), 46.
longirostris (Hippocampus), 201, 202.
longirostris (Lepisosteus), 330.
longirostris (Leptocephalus), 141.
longirostris (Monacanthus), 233.
longirostris (Oxymonacanthus), 233.
longirostris (Syngnathus), 167.
longirostris (Trachyrhamphus), 167.
longirostris (Triacanthus), 211.
longissima (Thyrsoidea), 127.
longissimus (Balistes), 214.
longissimus (Heteroconger), 45.
longus (Balistes), 214.
longus (Ophisurus), 83.
Lophobranchii, 150.
louisianæ (Syngnathus), 160.
Loutre, 389.
Loxodon, 376.
lubricum (Branchiostoma), 513.
lumbricalis (Petromyzon), 504.
lumbriciformis (Acus), 193.
lumbriciformis (Moringua), 91.
lumbriciformis (Nerophis), 193.
lumbriciformis (Scyphius), 193.
lumbriciformis (Syngnathus), 192, 193.
lumbricoidea (Moringua), 91.
lumbricoides (Ophichthys), 62.
lumbricoides (Ophiurus), 62.
lumbricoides (Pisoodonophis), 62.
lumbricoides (Sphagebranchus), 86.
lumbricus (Muræna), 16.
lumpus (Cyclopterus), 310.
lunaris (Gastrophysus), 275.
lunaris (Orthragoriscus), 318.
lunaris (Physogaster), 274.
lunaris (Promecocephalus), 275.
lunaris (Tetrodon), 274.
lunulatus (Balistes), 217.
lusitanicus (Centrophorus), 421.
lutea (Anguilla), 31.
Lycodontis, 93.
lymma (Raja), 483.
lymma (Tæniura), 483.
lymma (Trygon), 478, 483.

macassariensis (Muræna), 111.
macer (Polyprosopus), 395.
Machephilus, 419
maclellandi (Ophichthys), 63.
maclellandi (Ophisurus), 63.
maclellandii (Pisoodonophis), 63.
macloti (Carcharias), 362.
macloti (Hypoprion), 362.
maclura (Pastinaca), 487.
maclura (Pteroplatea), 487.
macracanthus (Alutarius), 251.
macrocephala (Moringua), 92.

macrocephala (Muræna), 23, 31.
macrocephalus (Aphthalmichthys), 92.
macrocephalus (Gymnomuræna), 133.
macrocerus (Monacanthus), 231.
macrochir (Centrurophis), 72.
macrochir (Moringua), 91.
macrochir (Ophichthys), 72.
macrochir (Ophisurus), 72.
macrodon (Ophichthys), 85.
macrodon (Sphagebranchus), 85.
Macrodonophis, 54.
macrodus (Squalus), 392.
macrophthalma (Anguilla), 28.
macrophthalmos (Muræna), 28.
macrops (Anguilla), 23.
macrops (Balistes), 214.
macrops (Conger), 40.
macrops (Thyrsoidea), 111.
macroptera (Anguilla), 32.
macroptera (Goniobatis), 492.
macropterus (Muræniehthys), 52.
macropterus (Triodon), 270.
macrorhinus (Loxodon), 376.
macrorhynchus (Carcharias), 358.
macrorhynchus (Læviraja), 464.
macrorhynchus (Ophisurus), 66.
macrorhynchus (Raja), 468.
macrorhynchus (Scoliodon), 358.
macrostoma (Chænogaleus), 376.
macrostoma (Hemigaleus), 376.
macrostoma (Sternarchus), 4.
macrostomus (Murænichthys), 53.
macrostomus (Petromyzon), 506.
macrourus (Carapus), 7.
macrura (Narcine), 452.
macrurus (Gymnotus), 7.
macrurus (Monacanthus), 247.
macrurus (Muræna), 127.
macrurus (Ophichthys), 59.
macrurus (Pseudomonacanthus), 247.
macrurus (Sternopygus), 7.
macrurus (Thyrsoidea), 127.
macrurus (Triacanthus), 210.
macrurus (Trygon), 474.
maculata (Muræna), 25, 27.
maculata (Myliobatis), 490.
maculata (Narcine), 452.
maculata (Raja), 458.
maculata (Strophidon), 112.
maculato-striatus (Diodon), 310.
maculatum (Scyllium), 400, 401.
maculatus (Balistes), 213, 214, 516.
maculatus (Canthidermis), 214.
maculatus (Diodon), 307.
maculatus (Galeocerdo), 378.
maculatus (Galeus), 378.
maculatus (Heptanchus), 399.
maculatus (Mustelus), 387.
maculatus (Notorhynchus), 398.
maculatus (Ostracion), 258, 260.
maculatus (Squalus), 401.
maculatus (Tetrodon), 295.
maculatus (Triakis), 387.
maculifer (Diodon), 309.
maculipinnis (Carcharias), 373.
maculipinnis (Isogomphodon), 373.
maculipinnis (Muræna), 124.
maculipinnis (Thyrsoidea), 124.
maculosa (Muræna), 81.
maculosus (Acipenser), 339.
maculosus (Aluterius), 229.
maculosus (Ophichthys), 81.
maculosus (Ophisurus), 81.
maculosus (Petromyzon), 502.
maculosus (Pisoodonophis), 81.
madeirensis (Pseudomuræna), 125.
maderensis (Muræna), 125.
maderensis (Raja), 459.
magdalenæ (Tæniura), 483.
magnifica (Pisoodonophis) 55.
magnioculis (Ophichthys), 59.
magnioculis (Scytalophis), 59.
makassariensis (Gymnothorax), 111.
malabarica (Anguilla), 36.
malaisianum (Scyllium), 411.
malayanum (Hemiscyllium), 412.
malgumora, 35.
malleus (Squalus), 381.
malleus (Zygæna), 381, 518.
manadensis (Doryichthys), 184.
manadensis (Hippocampus), 204.
manadensis (Syngn.), 184.
manatia (Raja), 497.
manazo (Mustelus), 387.
manillensis (Crayracion), 291.
manillensis (Muræna), 25.
manillensis (Tetrodon), 291.
Manjuari, 329.
mannulus (Hippocampus), 204.
manta (Cephaloptera), 498.
mantschuricus (Acipenser), 338.
maou (Squalus), 363.
mappa (Crayracion), 294.
mappa (Tetrodon), 293.
marcgravii (Rhinobatus), 444.
marcgravii (Sternopygus), 7.
margarita (Trygon), 479.
margaritatus (Canthogaster), 301.
margaritatus (Psilonotus), 301.
margaritatus (Tetraodon), 300, 301.

margaritatus (Tropidichthys, 301.
margaritifer (Syngnathus), 171.
margaritiferum (Chiloscyllium), 412.
margaritophorus(Gymnothorax), 101.
marginalis (Hippocampus), 198.
marginata (Anguilla), 29.
marginata (Myliobatis), 493.
marginata (Raja), 465.
marginata (Rhinoptera), 493.
marginata (Tæniophis), 124.
marginata (Thyrsoidea), 124.
marginatus (Conger), 38.
marginatus (Leptocephalus), 143.
marginatus (Leptorhinophis), 64.
marginatus(Murænopsis), 69.
marginatus (Ophichthys), 64.
marginatus (Ophiurus), 64.
marginatus (Trygon), 472.
marina (Typhle), 154.
marinus (Petromyzon), 501.
markworti (Pœcilocephalus), 69.
marmorata (Amia), 325.
marmorata (Anguilla), 24, 27.
marmorata (Dalophis), 88.
marmorata (Gymnomuræna), 133.
marmorata (Muræna), 25, 94.
marmorata (Pteroplatea), 487.
marmorata (Torpedo), 450.
marmorata (Unibranchapertura), 15.
marmoratum (Scyllium), 400.
marmoratus (Callechelys), 88.
marmoratus (Monopterus), 14.
marmoratus (Ophichthys), 88.
marmoratus (Rhamphichthys), 5.
marmoratus (Sphagebranchus), 88.
marmoratus (Symbranchus), 15.
marmoratus (Tetrodon), 284.
marmorea (Muræna), 119.
marmoreus (Murænophis), 119.
maroccana (Raja), 466.
marsiglii (Acipenser), 336.
Marsipobranchii, 499.
martensii (Syngnathus), 175.
martinicensis (Nerophis), 192.
massachusettensis (Monacanthus), 240.
massena (Cephaloptera), 496.
mathematicus (Tetrodon), 274.
mauritiana (Anguilla), 25.
mauritiana (Muræna), 94.
mauritianus (Scymnus), 428.
maxima (Selache), 394, 518.
maximiliani (Sternarchus), 2.
maximus (Squalus), 394.
medinilla (Balistes), 225.
mediorostris (Acipenser), 342.
mediorostris (Anguilla), 29.
mediterranea (Chimæra), 349.
meerdervoortii (Raja), 455.
megalodon (Pristis), 437.
megalopterus (Mustelus), 385.
megalurus (Monacanthus), 237.
megastoma (Anguilla), 34.
Melanichthys, 227.
melanocephalus (Monacanthus), 242.
melanochir (Anguilla), 32.
melanochir (Ophichthys), 74.
melanopleura (Balistes), 225.
melanopsis (Diodon), 307.
melanopterus (Carcharias), 369.
melanopterus (Prionace), 370.
melanopterus (Prionodon), 370.
melanorhynchus (Arothron), 293.
melanospila (Muræna), 109.
melanospila (Tæniura), 484.
melanospilos (Gymnothorax), 109.
melanospilus (Hippocampus), 202.
melanostomus (Pristiurus), 406.
melanotænia (Callechelys), 87.
melanotænia (Ophichthys), 87.
melanothos (Holocanthus), 274.
melanotis (Limamuræna), 98.
melanotis (Muræna), 98.
melanuropterus (Monacanthus), 231.
melanurum (Nettastoma), 48.
melastomum (Scyllium), 407.
melastomus (Scylliorhinus), 407.
meleagris (Crayracion), 294.
meleagris (Muræna), 96, 100, 102.
meleagris (Ostracion), 261.
meleagris (Priodonophis), 103.
meleagris (Tetrodon), 294, 299.
meleagris (Thyrsoidea), 100.
Melichthys, 212.
mellissii (Congromuræna), 42.
menisorrah (Carcharias), 371.
menisorrah (Prionodon), 371.
mento (Doryichthys), 181.
mento (Syngnathus), 181.
messinensis (Hyoprorus), 144.
meyeni (Tæniura), 483.
Micristodus, 396.
microcellata (Raja), 458.
microcephalus (Scymnus),

microcephalus (Squalus), 426.
microchir (Echelus), 51.
microchir (Moringua), 91.
microchir (Paramyrus), 51
microdon (Pristis), 436.
microdon (Pseudotriacis), 395.
microdon (Thyrsoidea), 125.
Microdonophis, 54.
Micromesus, 493.
Microphis, 179.
microphthalma (Narcine), 452.
microphthalmus (Gastrophysus), 278.
microphthalmus (Tetrabranchus), 17.
micropœcilus (Gymnothorax), 94.
micropœcilus (Muræna), 94.
microps (Carcharias), 373.
microptera (Anguilla), 29.
micropterus (Gymnomuræna), 134.
micropterus (Muræna), 133.
micropterus (Scymnus), 427.
microspila (Muræna), 109.
microstigmius (Myrophis), 51.
microstoma (Conger), 77.
microstoma (Hemigaleus), 375.
microstomus (Conger), 41.
microstomus (Murænichthys), 52.
microstomus (Sternopygus), 8.
micrura (Pteroplatea), 487.
micrura (Raja), 487.
Mielga, 417.
migratoria (Anguilla), 29.
Milandre, 379.
milberti (Carcharias), 363.
milberti (Eulamia), 363.
milberti (Prionodon), 363.
miliaris (Muræna), 100.
miliaris (Thyrsoidea), 100.
milii (Callorhynchus), 351.
millepunctatus (Doryichthys), 183.
milvus (Myliobatis), 490, 491.
Minhocâo, 323.
minimus (Ophisurus), 61.
minor (Muræna), 105.
minor (Priodonophis), 105.
miraletus (Raja), 458, 460, 462.
mitis (Balistes), 218, 517.
moa (Anguilla), 35.
moa (Muræna), 35.
Mobula, 496.
Mobular, 496.
modesta (Muræna), 126.
modestus (Chonerhinus), 271.
modestus (Syngnathus), 166.
modestus (Tetraodon), 271.
modestus (Xenopterus), 271.
mohnikei (Hippocampus), 206.
mokarran (Sphyrna), 383.
mokarran (Zygæna), 383.
mola (Cephalus), 317.
mola (Diodon), 317, 318.
mola (Orthagoriscus), 317.
mola (Tetrodon), 317.
Molacanthidæ, 318.
molendinaris (Muræna), 129.
Molina, 317.
moluccensis (Centrophorus), 421.
moluccensis (Dalophis), 85
moluccensis (Hippocampus), 202.
moluccensis (Muræna), 126.
moluccensis (Ophichthys), 85.
moluccensis (Pisoodonophis), 78.
moluccensis (Priodonophis), 126.
moluccensis (Sphagebranchus), 85.
monaca (Muræna), 125.
Monacanthus, 229.
monckei (Hippocampus), 202.
monensis (Squalus), 390.
monge (Notidanus), 397.
Monk, 430.
monoceros (Aluteres), 251.
monoceros (Balistes), 242, 251.
monoceros (Monacanthus), 251.
monochrous (Gymnothorax), 123.
monochrous (Muræna), 123.
Monopterhinus, 397.
Monopterus, 14.
Monotreta, 272.
Monotretus, 290.
monstrosa (Chimæra), 349.
moorii (Murænichthys), 53.
Mordacia, 507.
mordax (Conger), 56.
mordax (Macrodonophis), 56.
mordax (Mordacia), 507.
mordax (Muræna), 94.
mordax (Petromyzon), 507.
morena (Anguilla), 29.
moringa (Muræna), 96, 120.
Moringua, 90.
moringua (Muræna), 120.
mormyrus (Sternarchus), 4.
morrisii (Leptocephalus), 39, 139.
morula (Raja), 469.
mosaica (Raja), 456, 459.
mossambica (Anguilla), 28.
mossambicus (Syngnathus), 170.
motoro (Tæniura), 484.
mowa (Anguilla), 35.
mucosissima (Raja), 468.
mucronata (Raja), 468.
mucronatus (Neoconger), 49.
Mud-fish, 325.
Mud-Lamprey, 504.
mülleri (Carcharias), 360, 373.
mülleri (Ginglymostoma), 408.
mülleri (Muræna), 117.
mülleri (Prionodon), 373.
mülleri (Rhamphichthys), 6.
mülleri (Tæniura), 484.
mülleri (Trygonoptera), 486.
multidens (Conger), 40.
multidentata (Ptyobranchus), 90.
multifasciata (Thyrsoidea), 118.
multimaculatus (Diodon), 307.
multiocellata (Muræna), 94.

multiradiatus (Monacanthus), 248.
multistriatus (Anchisomus), 285.
multistriatus (Tetrodon), 285.
mundus (Urotrygon), 485.
munsing (Carcharias), 365.
munsing (Prionodon), 365.
Muræna, 93.
muræna (Gymnothorax), 96.
muræna (Syngnathus), 164.
Murænesocina, 45.
Murænesox, 45.
Murænichthys, 52.
Murænidæ, 19.
Murænina, 93.
Murænoblenna, 133.
Murænoidei, 19.
Murænophis, 93.
Murænopsis, 54.
Mustelina, 383.
Mustelus, 385.
mustelus (Galeus), 386.
mustelus (Squalus), 385.
Myliobatidæ, 488.
Myliobatina, 488.
Myliobatis, 488.
Mylorhina, 493.
myriaster (Anguilla), 40.
Myrichthys, 19.
Myrina, 49.
Myriosteon, 436.
Myroconger, 93.
Myrophis, 50.
Myrus, 49.
myrus (Anguilla), 50.
myrus (Conger). 50.
myrus (Muræna), 38, 46, 50.
mystax (Congromur.), 43.
mystax (Muræna), 43.
Mystriophis, 54.
Myxine, 510.
Myxinidæ, 510.

naccarii (Acipenser), 336, 517.
nævus (Raja), 462.
Nannocampus, 178.
nanus (Urocampus), 179.
narce (Raja), 449.
narce (Torpedo), 449.
Narcine, 452.
Narcobatis, 448.
nardoi (Acipenser), 336.
narinari (Aëtobatis), 492.
naritus (Chonerhinus), 271.
naritus (Tetraodon), 271.
naritus (Xenopterus), 271.
narke (Torpedo), 449.
nasicornis (Alutera), 254.
nasicornis (Monacanthus), 254.
nasicornis (Pseudaluteres), 254.
nasus (Acipenser), 337, 517.
nasus (Diplanchias), 318.
nasus (Mola), 318.
nasus (Ostracion), 263.
nasus (Squalus), 390.
nasuta (Raja), 469.
natalensis (Squalus), 386.
natalensis (Tetrodon), 303.
natans (Pegasus), 148, 149.
nattereri (Sternarchus), 3.
Nebrius, 407, 409.
nebulosa (Anguilla), 27.
nebulosa (Muræna), 96, 130.
nebulosus (Balistes), 211.
nebulosus (Gymnothorax), 130.
Nejonögon. 501.
nematophorus (Monacanthus), 241.
Nematosoma, 190.
Nemichthyina, 21.
Nemichthys, 21.
nemurus (Monacanthus), 242.
nemurus (Paramonacanthus), 242.
Neoconger, 49.
neoguinaicum (Ophisoma), 43.
neoguinaicus (Conger), 43.
Nerophis, 190.
Nettastoma, 48.
nicæensis (Scymnus), 426.
nicæensis (Squalus), 426.
nicthemerus (Diodon), 315.
nieuhofi (Triacanthus), 209.
nieuhofii (Myliobatis), 491.
nieuhofii (Raja), 491.
niger (Balistes), 218, 228.
niger (Conger), 39.
niger (Erythrodon), 228.
niger (Petromyzon), 504.
niger (Spinax), 424.
niger (Xenodon), 428.
nigra (Narcine), 453.
nigra (Stigmatophora), 190.
nigra (Torpedo), 449.
nigricans (Enchelycore), 135.
nigricans (Muræna), 135.
nigricans (Murenophis), 135.
nigricans (Petromyzon), 503.
nigrolineata (Muræna), 94.
nigrolineatus (Diodon), 310.
nigromaculata (Apterigia), 15.
nigromarginata (Neomuræna), 103.
nigropunctatus (Crayracion), 293.
nigropunctatus (Tetrodon), 293.
nigroviridis (Tetrodon), 299.
nilotica (Anguilla), 29.
nitens (Monacanthus), 229.
nitidus (Balistes), 221.
niveatus (Tetraodon), 278.
nobiliana (Torpedo), 449.
noordzicki (Conger), 38.
norvegicus (Squalus), 427.
notacanthus (Ostracion), 258.
notatus (Balistes), 221.
Notidanidæ, 397.
Notidanus, 397.
Notorhynchus, 399.
novæ hollandiæ (Hippocampus), 201.
novæorleanensis (Anguilla), 31.
novæterræ (Anguilla). 29.
novemmaculatus (Diodon), 307.
novemmaculatus (Paradiodon), 307.
nubila (Muræna), 105, 110, 117, 118.
nuda (Trygon), 476.
nudipinnis (Pristiophorus), 432.
nudiventris (Acipenser), 336, 517.
nudivomer (Muræna), 104.
Nurse Hound, 403.
nycthemerus (Atopomycterus), 315.

obesus (Carcharias), 383.
obesus (Echinorhinus), 428.

obesus (Triænodon), 383.
obliteratus (Alutarius), 251.
oblongus (Cephalus), 320.
oblongus (Monacanthus), 241.
oblongus (Orthagoriscus), 320.
oblongus (Physogaster), 278.
oblongus (Tetrodon), 278.
obscurus (Carcharias), 366, 518.
obscurus (Platypodon), 366.
obscurus (Prionodon), 366.
obscurus (Squalus), 366.
obtusa (Eulamia), 363.
obtusirostris (Acipenser), 341.
obtusus (Rhinobatus), 443.
obtusus (Squalus), 363.
obvelatus (Prionodon), 366.
occa (Pristis), 437.
occidentalis (Amia), 325.
occidentalis (Conger), 39.
occidentalis (Monacanthus), 237.
occidentalis (Torpedo), 448.
oceanica (Anguilla), 40.
ocellata (Muræna), 102.
ocellata (Murænopsis), 68.
ocellata (Raja), 455.
ocellata (Torpedo), 449, 453.
ocellatum (Chiloscyllium), 410.
ocellatus (Canthogaster), 301.
ocellatus (Diodon), 279.
ocellatus (Gymnothorax), 102.
ocellatus (Ophichthys),
ocellatus (Ophisurus), 68.
ocellatus (Priodonophis), 103.
ocellatus (Psilonotus), 301.
ocellatus (Squalus), 410.
ocellatus (Tetrodon), 279, 300, 301.
ocellicauda (Amia), 325.
oculata (Raja), 461.
oculata (Squatina), 431.
oculata (Torpedo), 450.
oculatum (Hemiscyllium), 411.
oculatus (Balistes), 214.
oculatus (Canthidermis), 214.
oculatus (Cylindrosteus), 329.
oculatus (Lepisosteus), 329.
oculatus (Monacanthus), 235.
oculatus (Pisoodonophis), 82.
oculatus (Sphagebranchus), 84.
oculeus (Myliobatis), 491.
oculus (Helmichthys), 140.
Odontaspis, 392.
oiré (Balistes), 227.
olfersii (Cephaloptera), 497.
olfersii (Dicerobatis), 497.
oligopeltis (Acipenser), 345.
oligopeltis (Antaceus), 345.
olivacea (Murænoblenna), 134.
omalii (Petromyzon), 503.
Ophicardia, 14.
Ophichthyina, 54.
Ophichthys, 54.
ophidion (Nerophis), 192.
ophidion (Scyphius), 192.
ophidion (Syngnathus), 191, 192, 193.
Ophiognathus, 22.
ophis (Muræna), 130.
ophis (Ophisurus), 81.
ophis (Thærodontis), 130.
Ophisoma, 40.
Ophisternon, 15.
Ophisuraphis, 54.
Ophisurus, 54.
opistophthalmus (Conger), 41.
oppositus (Monacanthus), 240.
orbicularis (Chilomycterus), 312.
orbicularis (Cyclichthys), 312.
orbicularis (Diodon), 312.
orbicularis (Raja), 482.
orbicularis (Trygon), 482.
orbignyanus (Conger), 37.
orbignyi (Tæniura), 484.
orientalis (Acipenser), 333.
orientalis (Dalophis), 87.
orientalis (Ophichthys), 87.
orientalis (Sphagebranchus), 87.
ornata (Amia), 325.
ornata (Aracana), 267.
ornata (Ostracion), 267.
ornata (Pœcilophis), 131.
ornata (Trygon), 483.
ornatissimus (Balistes), 223.
ornatissimus (Herpetoichthys), 67.
ornatissimus (Ophichthys), 67.
ornatum (Scyllium), 412.
ornatus (Balistes), 252.
ornatus (Ostracion), 262.
ornatus (Tetrodon), 303.
orsini (Ozodura), 318.
Orthagoriscus, 317.
orthagoriscus (Cephalus), 317.
Orthragoriscus, 317.
osseus (Esox), 330.
osseus (Lepidosteus), 330.
osteosticta (Trygon), 480.
Ostracion, 255.
Ostraciontina, 255.
otaheitensis (Anguilla), 24.
otarius (Lepisosteus), 330.
oviceps (Lactophrys), 256.
owenii (Pristiophorus), 432.
Ox-Ray, 496.
oxycephalus (Triacanthus), 210.
Oxyconger, 48.
Oxymonacanthus, 229.
Oxynotus, 417.
Oxyrhina, 389.
oxyrhina (Muræna), 29.
oxyrhynchus (Acipenser), 343.
oxyrhynchus (Carcharias), 375.
oxyrhynchus (Conger), 46.
oxyrhynchus (Huso), 343.
oxyrhynchus (Isogomphodon), 375.
oxyrhynchus (Læviraja), 469.
oxyrhynchus (Prionodon), 375.
oxyrhynchus (Raja), 455, 465, 469.
oxyrhynchus (Sternarchus), 4.
oxyurus (Lepisosteus), 330.
Ozodura, 317.
ozodura (Orthragoriscus), 318.

pachycephalus (Tetrodon), 274.
pachygaster (Cheilichthys), 287.
pachygaster (Tetrodon), 287.
pacifici (Ophichthys), 76.
palembangensis (Crayracion), 288.
palembangensis (Tetrodon), 288.
Pallasia, 318.
pallens (Ophichthys), 61.
pallens (Ophisurus), 61.
pallens (Pisoodonophis), 61.
palmas (Polypterus), 327.
panthera (Torpedo), 451.
pantherina (Murænophis), 116.
pantherina (Sidera), 116.
pantherinum (Scyllium), 406.
pantherinus (Cestracion), 416.
pantherinus (Gymnothorax), 116.
pantherinus (Ichthyophis), 133.
pantherinus (Rhamphichthys), 5.
pantherinus (Tetrodon), 295.
papacinus (Nerophis), 192.
papacinus (Scyphius), 192.
papacinus (Syngnathus), 192.
papillosus (Balistes), 243.
papua (Tetrodon), 301.
Parabalistes, 212.
Paradiodon, 306.
paradoxa (Fistularia), 152.
paradoxa (Lepidosiren), 323.
paradoxum (Solenostoma), 152.
paragaudatus (Aleuterius), 250.
Paraluteres, 229.
Paramonacanthus, 229.
Paramyrus, 51.
Parascyllium, 410.
Paratrygon, 472, 482.
pardalis (Gymnothorax), 99.
pardalis (Liomonacanthus), 231.
pardalis (Monacanthus), 230.
pardalis (Muræna), 99.
pardalis (Ophichthys), 82.
pardalis (Ophisurus), 82.
pardalis (Tetrodon), 281.
pareh (Trygon), 473.
pareva (Aluteres), 252.
parilis (Ophichthys), 59.
parilis (Ophisurus), 59.
parilis (Scytalophis), 59.
parraianus (Monocanthus), 231.
parvidentata (Ptyobranchus), 90.
parvus (Tetraodon), 291.
passan (Apteronotus), 2.
pastinaca (Raja), 478.
pastinaca (Trygon), 478.
pastinaca (Trygonobatus), 478.
Pastinachus, 473.
pastinacoides (Trygon), 473.
patoca (Leiodon), 289.
patoca (Tetrodon), 278, 288.
pauciporus (Ophichthys), 60.
pavonina (Muræna), 98.
peckianus (Syngnathus), 157.
pectinatus (Pristis), 437.
Pedalion, 317.
Pegasidæ, 146.
Pegasus, 147.
pekinensis (Muræna), 29.
pelagicus (Syngnathus), 154, 157, 165.
peli (Pœcilophis), 132.
peli (Rhinoptera), 493.
pelii (Muræna), 132.
pellucidum (Ophidium), 139.
pellucidus (Lepidopus), 141.
penicilligerus (Chætodermis), 245.
penicilligerus (Monacanthus), 245.
penicillus (Syngnathus), 171.
pennanti (Squalus), 390.
pennantii (Lagocephalus), 273.
pennantii (Tetrodon), 273.
pentacanthus (Ostracion), 264.
pentacornis (Ostracion), 264.
pentagonus (Syngnathus), 173.
peregrinus (Squalus), 394.
perlatus (Syngnathus), 174.
Perlon, 398.
peronii (Callorhynchus), 351.
peronii (Monacanthus), 249.
perrotteti (Pristis), 436.
personatus (Aluteres), 253.
personatus (Monacanthus), 253.
perspicillaris (Tetraodon), 297.
petelli (Gymnothorax), 105.
petelli (Muræna), 105.
petersii (Tetrodon), 300.
Petromyzon, 500.
Petromyzontidæ, 499.
pfeifferi (Muræna), 116.
pfeifferi (Sidera), 116.
phaleratus (Balistes), 213.
phayriana (Ophicardia), 14.
philippi (Heterodontus), 415.
philippi (Rhinobatus), 443.
phillipi (Cestracion), 415.
phillippi (Squalus), 415.
phlegon (Syngnathus), 156.
Phyllopteryx, 196.
phymatodes (Scyllium), 412.
physa (Tetraodon), 290.
Physodon, 360.
Physogaster, 271.
piceus (Balistes), 228.
picta (Muræna), 116
picta (Torpedo), 450.
pictum (Lamnostoma), 87.
pictum (Scyllium), 401.
picturata (Alutera), 252.
pictus (Gymnothorax), 116.
pictus (Torpedo), 453.
pilosus (Diodon), 316.
pilosus (Holocanthus), 291.
pilosus (Trichodiodon), 316.
pinnata (Muræna), 23.
pinnatus (Synaphobranchus), 23.
Pipe-fish, 191.

Pipe-fish, Broad-nosed, 154.
Pipe-fish, Great, 157.
Pipe-fish, Little, 193.
Pipe-fish, Ocean, 191.
Pipe-fish, Snake, 191.
Pipe-fish, Straight-nosed, 192.
Pira-aca, 237.
Pisoodonophis, 54.
Placoganoidei, 332.
Plagiostomata, 353.
plagiosum (Chiloscyllium), 412.
plagiosum (Scyllium), 411.
planci (Mola), 320.
planci (Tympanomium), 318.
planeri (Lampetra), 505.
planeri (Petromyzon), 504.
Planirostra, 346.
platifrons (Monacanthus), 229.
platirhynchus (Scaphirhynchus), 345.
platorhynchus (Acipenser), 345.
platostomus(Lepisosteus), 329.
platycephala (Anguilla), 29.
platycephalus (Heptanchus), 398.
platycephalus (Notidanus), 398.
platycephalus (Squalus), 398.
platyodon (Squalus), 363.
Platypodon, 363.
Platyrhina, 470.
platyrhina (Muræna), 32.
platyrhinchus (Lepisosteus), 329.
platyrhynchus (Anguilla), 32.
platyrhynchus (Squalus), 379.
platyrhynchus (Thalassorhinus), 379.
platystomus (Lepidosteus), 329.
plebejus (Mustelus), 386.
Plectognathi, 207.
Pleuracromylon, 385.
pleurostictus (Doryichthys), 185.
pleurostictus(Microphis), 185.
pleurotænia (Carcharias), 374.
pleurotænia (Prionodon), 374.
playfairii (Carcharias), 362.
playfairii (Ophichthys), 76.
plumbeus (Petromyzon), 505.
plumieri (Diodon), 306.
plumieri (Tetrodon), 284.
Pneumabranchus, 13.
Pœcilocephalus, 54.
pœcilolæmus (Syngnathus), 174.
pœcilonotus (Tetraodon), 278.
Pœcilophis, 93, 128.
pœcilura (Raja), 487.
pœcilurus (Trygon), 487.
Pogonognathus, 255.
politus (Tetrodon), 281.
Pollee-makum, 409.
polleni (Narcacion), 450.
polyacanthus (Syngnathus), 184.
polylepis (Trygon), 475.
Polyodon, 346.
polyodon (Cirrhimuræna), 75.
polyodon (Muræna), 128.
polyodon (Ophisurus), 75.
polyodon (Rhinoptera), 495.
polyodon (Strophidon), 128.
Polyodontidæ, 346.
polyophthalmus (Dalophis), 85.
polyophthalmus (Gymnothorax), 110.
polyophthalmus (Muræna), 109.
polyophthalmus (Ophichthys), 73, 85.
polyophthalmus (Rhinobatus), 446.
polyophthalmus (Sphagebranchus), 86.
polyophthalmus (Syrrhina), 446.
polyprion (Solegnathus), 195.
Polyprosopus, 395.
Polypteridæ, 326.
Polypterus, 326, 517.
polytænia (Hippocampus), 202.
polytrema (Bdellostoma), 512.
polyuranodon, 93.
polyuranodon (Gymnothorax), 114.
polyuranodon (Muræna), 114.
polyzona (Echidna), 129.
polyzona (Heteroconger), 44.
polyzona (Muræna), 129.
polyzonus (Pœcilophis), 129.
pontica (Raja), 456.
ponticerianus (Ichthyocampus), 177.
ponticus (Syngnathus), 154.
Porbeagle, 389.
porcatus (Balistes), 226.
Porobronchus, 145.
Poroderma, 400.
porosus (Carcharias), 365.
porosus (Prionodon), 365.
porosus (Squalus), 357.
porphyreus (Murenophis), 94.
porphyreus (Ophisurus), 56.
porphyreus (Tetrodon), 287.
porphyrus (Mystriophis), 56.
potamophilus (Ophisurus), 77.
potamophilus (Pisoodonophis), 77.
potamophilus (Tetrodon), 299.
prasina (Muræna), 123.
praslensis (Balistes), 225.
praslinensis (Balistes), 225.
praslinoides (Balistes), 225.
prat-bernon, 116.
pratbernon(Muræna),119.
pricka (Petromyzon), 503.
Pride, 504.
Prilonotus, 271.
Priodonophis, 93.
Prionace, 363.
Prionodon, 363.
prionurus (Alutarius), 234.
prionurus(Monacanthus), 234.
prionurus (Paraluteres), 234.
prionurus (Squalus), 406.
Pristidæ, 436.
Pristiophoridæ, 431.

Pristiophorus, 431.
pristipeltis (Doryichthys), 179.
Pristis, 436.
pristis (Murænesox), 45.
pristis (Pegasus), 148.
pristis (Squalus), 438.
Pristiurus, 406.
proboscideus (Monacanthus), 252.
productus (Cylindrosteus), 330.
productus (Rhinobatus), 441, 518.
Promécocéphale, 271.
prosopeion (Gymnothorax), 113.
prosopeion (Muræna), 113.
protervus (Congrus), 46.
Protocampus, 193.
Protomelus, 322.
Protopterus, 322.
Prymnothonus, 145.
Psammobatis, 470.
Psilocephalus, 255.
psittacus (Chelichthys), 286.
psittacus (Tetrodon), 286.
Pseudaluteres, 229.
Pseudobalistes, 212.
Pseudomonacanthus, 229.
Pseudomoringua, 90.
Pseudomuræua, 93.
pseudopterus (Tetrodon), 295.
pseudothyrsoidea (Muræna), 112.
pseudothyrsoideus (Gymnothorax), 112.
Pseudotriacis, 395.
Ptyobranchina, 90.
Ptyobranchus, 90.
Pteroplatea, 486.
pterygera (Cœcula), 85.
pullus (Monacanthus), 231.
punctata (Alutera), 254.
punctata (Lamna), 390, 518.
punctata (Lycodontis), 112.
punctata (Muræna), 102, 113, 120.
punctata (Murenophis), 100.
punctata (Oxyrhina), 391.
punctata (Raja), 456, 458.
punctata (Strophidon), 112.
punctata (Trygon), 474.
punctatissima (Anguilla), 31.
punctatissimus (Tetrodon), 502.
punctato-fasciata (Muræna), 106.
punctato-fasciatus (Gymnothorax), 106.
punctatum (Chiloscyllium), 413.
punctatus (Aprionodon), 361.
punctatus (Balistes), 216, 236.
punctatus (Carcharias), 361.
punctatus (Diodon), 306.
punctatus (Gymnothorax), 102.
punctatus (Leptocephalus), 140.
punctatus (Micristodus), 396.
punctatus (Monacanthus), 234, 254.
punctatus (Myrophis), 50.
punctatus (Ostracion), 261.
punctatus (Squalus), 361, 408.
punctatus (Tetrodon), 282.
puncticeps (Cryptopterus), 60.
puncticeps (Ophichthys), 60.
punctifer (Crotalopsis), 56
punctifer (Ophichthys), 56
punctipinnis (Dermatostethus), 156.
punctulatus (Anguisurus), 86.
punctulatus (Dicotylichthys), 315.
punctulatus (Hippocampus), 202.
punctulatus (Mustelus), 385.
punctulatus (Squalus), 408
punctus (Conger), 41.
punctus (Congromuræna), 41.
Purague, 444.
purpurea (Trygon), 472.
pusillum (Acanthidium), 425.
pusillus (Monacanthus), 229.
pusillus (Spinax), 425.
pustulatus (Tetrodon), 291
putaol (Gymnotus), 9.
putnami (Acipenser), 333.
putnami (Antaceus), 333.
pygmæus (Acipenser), 335, 340.
Pyrodon, 212.
pyrois (Siphonostomus), 154.
pyrois (Syngnathus), 154.
python (Muræna), 106.

quadratus (Ophichthys), 89.
quadratus (Sphagebranchus), 89.
quadricornis (Acanthostracion), 258.
quadricornis (Ostracion), 257.
quadriloba (Raja), 494.
quadriloba (Rhinoptera), 494.
quadrimaculata (Raja), 461, 462.
quadrimaculatus (Diodon), 307.
quadrimaculatus (Paradiodon), 307.
quincunciatus (Ophichthys), 83.
quinqueaculeata (Raja), 492.
quoyi (Cestracion), 416.
quoyi (Heterodontus), 416

radiata (Raja), 460.
radula (Dasybatis), 461.
radula (Raja), 461, 462.
rafinesquii (Scaphirhynchus), 345.
Raitaboura, 90.
Raja, 455.
Rajidæ, 455.
ramulosus (Hippocampus), 201.
Ranzania, 317, 319.
rashleighanus (Polyprosopus), 395.
rashleighanus (Squalus), 395.
ratzeburgii (Acipenser), 340.
rayneri (Galeocerdo), 377.
Ray, Painted, 458.
Ray, Spotted, 458.
rectangulus (Balistes), 225.
redi (Orthragoriscus), 318.
reevesii (Muræna), 107.
reevesii (Ostracion), 267,
regius (Herpetoichthus), 66.
regius (Ophichthys), 66.
regius (Ophisurus), 66.
reinhardtii (Anguilla), 27.

reinhardtii (Rhamphichthys), 5.
remicaudus (Centrurophis), 73.
remicaudus (Ophichthys), 73.
remiger (Ophisurus), 68.
remotus (Carcharias), 363.
remotus (Prionodon), 363.
Renard marin, 393.
renardi (Ostracion), 262.
Reniceps, 380.
reticularis (Anchisomus), 282.
reticularis (Gymnothorax), 104.
reticularis (Muræna), 105.
reticularis (Murænophis), 105.
reticularis (Tetrodon), 296.
reticulata (Amia), 325.
reticulata (Muræna), 104.
reticulata (Spatularia), 346
reticulata (Thærodontis), 106.
reticulatus (Balistes), 222.
reticulatus (Chilomyterus), 313.
reticulatus (Diodon), 309, 313.
reticulatus (Gymnothorax), 105.
reticulatus (Tetraodon), 293.
retzii (Mola), 318.
retzii (Orthragoriscus), 318.
retzii (Syngnathus), 175.
Rhachinotus, 471.
Rhamphichthys, 4.
Rhamphobatis, 440.
Rhamphosternarchus, 4.
Rhina, 430, 440.
Rhinidæ, 430.
Rhinobatidæ, 440.
Rhinobatus, 440, 441.
rhinobatus (Raja), 446.
rhinobatus (Rhinobatus), 443.
rhinoceros (Aluteres), 254.
Rhinocryptis, 322.
rhinocryptis (Protopterus), 322.
Rhinodon, 396.
Rhinodontidæ, 396.
Rhinoptera, 493.
rhinorhynchus (Ostracion), 263.
Rhinoscymnus, 426.
Rhinotriacis, 384.
rhodocephalus (Gymnothorax), 111.
rhodochilus (Echidna), 132.
rhodochilus (Muræna), 132.
rhodopterus (Triacanthus), 209.
rhynchænus (Syngnathus), 154.
rhynchæus (Acipenser), 339.
Rhynchobatus, 440.
Rhynchote, 271.
Rhynchotus, 272.
rhytidoderma (Ophichthys), 63.
rhytidodermatoides (Ophichthys), 62.
richardsonii (Gymnothorax), 118.
richardsonii (Muræna), 118.
richei (Amblyrhynchotus), 285.
richei (Gastrophysus), 285.
richei (Tetrodon), 285.
ringens (Balistes), 221, 228.
ringens (Centrophorus), 423.
ringens (Melichthys), 228.
ringens (Scymnodon), 423.
rissoi (Tilurus), 144.
River Lamprey, 502.
rivulatus (Balistes), 222.
rivulatus (Diodon), 310.
rivulatus (Tetrodon), 305.
Rödhaae, 406.
romana (Muræna), 96.
rondeletii (Carcharias), 378.
rondeletii (Carcharodon), 392, 518.
rondeletii (Hippocampus), 199.
rondeletii (Orthragoriscus), 318.
rondeletii (Siphonostomus), 154.
rondeletii (Syngnathus), 154.
rosaceus (Hippocampus), 201.
rostellata (Raja), 465.
rostellatus (Mystriophis), 56.
rostellatus (Ophichthys), 56.
rostellatus (Ophisurus), 56
rostrata (Muræna), 31.
rostrata (Murenophis), 120.
rostrata (Raja), 465, 469.
rostratus (Gymnotus), 5.
rostratus (Gymnothorax), 120.
rostratus (Læmargus), 427, 518.
rostratus (Ophisurus), 46, 61.
rostratus (Rhamphichthys), 5.
rostratus (Scymnus), 427.
rostratus (Sphagebranchus), 55.
rostratus (Squalus), 390.
rostratus (Tetrodon), 303.
rotundatus (Balistes), 214.
rotundatus (Siphonostomus), 155.
rotundatus (Syngnathus), 155.
rousseaui (Syngnathus), 163.
Roussette, Grande, 402.
Roussette, Petite, 403.
ruber (Petromyzon), 504.
rubicundus (Acipenser), 338.
rubescens (Conger), 37.
rubescens (Syngnathus), 157.
rubripes (Gastrophysus), 279.
rubripes (Tetrodon), 279.
rubus (Dasybatis), 456.
rubus (Raja), 456, 458.
rudis (Monacanthus), 244.
rudis (Psammobatis), 470.
rudis (Trygon), 479.
rüpelliæ (Dalophis), 104.
rupertianus (Acipenser), 339.
rüppellii (Ginglymostoma), 409.
rüppellii (Monacanthus), 231.
rüppellii (Muræna), 104.
russellii (Squalus), 358.
russellii (Triacanthus), 209.
russellii (Trygon), 473.
ruthenus (Acipenser), 335.
rutidoderma (Ophisurus), 63.
rutidodermatoides, 62.

Sabaco, 213.
sabina (Trygon), 480.
saccogularis (Apterigia), 15.
Saccopharyngina, 22.
Saccopharynx, 22.
saga (Muraenophis), 48.
sagenodeta (Gymnothorax), 117.
sagenodeta (Muræna), 117.
Sagre, 424.
salviani (Centrina), 417.
salviani (Raja), 469.
sanctæ helenæ (Muræna), 115.
sanctæ helenæ (Tetrodon), 304.
sancur (Raja), 482.
Sand-piper, 504.
sandwichiensis (Balistes), 230.
Sandy Ray, 462.
sanguinea (Muræna), 126.
sanguineus (Pythonichthys), 126.
sanguinolentus (Carapus), 7.
sanguisuga (Petromyzon), 504.
sathete (Muræna), 126.
sathete (Murænophis), 126.
sathete (Thyrsoidea), 126.
Saurenchelys, 48.
savanna (Brachyconger), 47.
savanna (Conger), 47.
savanna (Muræna), 47.
savanna (Murænesox), 47.
savignyi (Anguilla), 29.
sayi (Myliobatis), 478.
sayi (Raja), 478.
sayi (Trygon), 478.
scaber (Arothron), 291.
scaber (Balistes), 249.
scaber (Tetraodon), 291.
scalaris (Ichthyocampus), 177.
Scaphirhynchus, 345.
sceleratus (Tetrodon), 276.
schaapi (Ophisurus), 78.
schaapi (Pisoodonophis), 78.
schipa (Acipenser), 336.
schismatorhynchus (Gymnothorax), 127.
schismatorhynchus (Muræna), 127.
schlegelii (Rhinobatus), 445.
schlegelii (Syngnathus), 160.
schmidtii (Hoplunnis), 49.
schmittii (Balistes), 219.
schneideri (Rhamphichthys), 5.
schomburgkii (Rhamphichthys), 5.
schönleinii (Platyrhina), 471.
schotti (Sternarchus), 3.
schrenckii (Acipenser), 517.
schultzii (Murænichthys), 52.
schultzii (Raja), 458.
schypa, 333, 336, 340.
Sclerodermi, 207.
scobina (Raja), 455.
scobina (Uraptera), 455.
Scolecosoma, 501.
Scoliodon, 357.
scoliodon (Gymnothorax), 118.
scoliodon (Muræna), 118.
scolopacea (Nemichthys), 21.
scopas (Amanses), 232.
scopas (Monacanthus), 232.
scriptus (Aluteres), 252.
scriptus (Balistes), 252.
scriptus (Gymnothorax), 94, 100.
scriptus (Monacanthus), 252.
sculptus (Doryichthys), 185.
Scylliidæ, 400.
Scylliorhinus, 400.
Scyllium, 400.
scyllium (Triacis), 384.
Scymnodon, 419.
Scymnus, 425.
Scyphius, 190.
Scytalophis, 54.
Sea-Devil, 496, 498.
Sea-Fox, 393.
Sea-horse, 199.
Sea-Lamprey, 501.
sebæ (Ostracion), 261.
See-Neunauge, 501.
Selache, 394.
Selachina, 394.
Selachoidei, 353.
selanonus (Squalus), 390.
semicinctus (Liuranus), 54.
semicinctus (Ophichthys), 80.
semicinctus (Ophisurus), 54, 80.
semifasciata (Triacis), 384.
semifasciatum (Triakis), 384.
semifasciatus (Syngnathus), 162.
semiradiatus (Lepisosteus, 330.
semisagittatus (Pristis), 439.
semistriatus (Leptonotus), 162.
semistriatus (Tetraodon), 297.
senegalus (Polypterus), 326.
senticosus (Balistes), 214.
sephen (Hypolophus), 482.
sephen (Raja), 482.
sephen (Trygon), 482.
septocuille (Petromyzon), 504.
serpens (Ophichthys), 65.
serpens (Ophisurus), 65.
serpentina (Muræna), 23.
serra (Pristis), 458.
serradentata (Murænesox), 45.
serrasquamosus (Monacanthus), 229.
serraticornis (Balistes), 251.
serratus (Syngnathus), 167.
serratus (Trachyrhamphus), 167.
sesquilineatus (Balistes), 226.
setifer (Monacanthus), 239.
seuruga (Acipenser), 340.
Sewrjuga, 340.
sexcornutus (Lactophrys), 258.
sex-cornutus (Ostracion), 258.
sexmaculatus (Diodon), 307.
Shagreen Ray, 467.
Shark, Basking, 394.
Shark, Beaumaris, 389.
Shark, Great Blue, 392.
Shark, Greenland, 427.
Shark, Heart-headed, 382.
Shark, Long-tailed, 393.
Shark, Port-Jackson, 415.
Shark, Spinous, 428.

shavianus (Cetorhinus), 394.
sibbaldi (Syngnathus), 191.
sidat, 36.
Sidera, 93.
siderea (Muræna), 116.
signatus (Balistes), 222.
signatus (Hypoprion), 362.
signifer (Monacanthus), 239.
similis (Muræna), 117.
simulans (Tetrodon), 299.
sinensis (Acipenser), 338.
sinensis (Anguilla), 32.
sinensis (Balistes), 235.
sinensis (Ophisurus), 78.
sinensis (Platyrhina), 471.
sinensis (Rhina), 471.
singapurensis (Conger), 46.
singapurensis (Murænesox), 46.
singapurensis (Ophichthys), 71.
sinus persici (Torpedo), 448.
Siphonostoma, 154.
Sirenoidei, 321.
Skate, Burton, 465.
Skate, Common, 463.
sloani (Raja), 485.
smithii (Leptocarcharias), 384.
smithii (Raja), 467.
smithii (Rhinoptera), 494.
smithii (Torpedo), 451.
smithii (Triænodon), 384.
smythii (Callorhynchus), 351.
sobaco (Balistes), 214.
solandri (Tetrodon), 300.
solaris (Orthragoriscus), 318.
Solenognathus, 195.
Solenostoma, 150.
Solenostomidæ, 150.
solorensis (Ostracion), 262.
Somniosus, 426.
sordida (Muræna), 131.
sordidus (Tetraodon), 291.
sorrah (Carcharias), 367.
sorrah (Isoplagiodon), 367.
sorrah (Prionodon), 367.
spadiceus (Centrurophis), 69, 70.
spadiceus (Ophisurus), 70.
spadiceus (Tetrodon), 275.
spallanzani (Leptocephalus, 84, 139.
spallanzanii (Lamna), 390, 518.
spallanzani (Sphagebranchus), 89.
spallanzanii (Oxyrhina), 390.
spallanzanii (Squalus), 370.
spatula (Lepisosteus), 329.
spatula (Pegasus), 148.
spatula (Planirostra), 346.
Spatularia, 346.
spengleri (Tetrodon), 284.
Sphagebranchus, 54.
Sphyrna, 380.
spicifer (Syngnathus), 172, 174.
spilogaster (Ostracion), 267.
spilomelanurus (Monacanthus), 250.
spilosoma (Monacanthus), 243.
Spinacidæ, 417.
Spinax, 424.
spinax (Squalus), 424.
spinicauda (Ellipesurus), 472.
spinosa (Raja), 462.
spinosissima (Trygon), 472.
spinosissimus (Diodon), 307.
spinosissimus (Monacanthus), 245.
spinosissimus (Solenognathus), 195.
spinosus (Doryichthys), 180.
spinosus (Echinorhinus), 428.
spinosus (Goniodus), 428.
spinosus (Orthagoriscus), 318.
spinosus (Rhinobatus), 518.
spinosus (Scymnus), 428.
spinosus (Squalus), 428.
squamosus (Acanthorhinus), 422.
squamosus (Centrophorus), 422.
squamosus (Squalus), 422.
Squatina, 430.
squatina (Rhina), 430.
squatina (Squalus), 430
Squatinoraja, 446.
Stegostoma, 409.
stellare (Scyllium), 402.
stellaris (Antaceus), 340.
stellaris (Balistes), 213.
stellaris (Mustelus), 386.
stellaris (Scylliorhinus), 403.
stellaris (Squalus). 403.
stellata (Murænophis), 93.
stellatus (Acipenser), 340.
stellatus (Balistes), 212.
stellatus (Crayracion), 295.
stellatus (Leiurus), 213.
stellatus (Tetrodon), 273, 294, 297.
stellifer (Ostracion), 259.
stellifera (Muræna), 101.
stelligera (Cephaloptera), 498.
stenops (Leptocephalus), 144.
Stephanolepis, 229.
Sterlet, 335.
Sterleta, 333.
sterleta (Acipenser), 335.
Sternarchus, 2.
Sternopygus, 7.
Stethopterus, 54.
stictonotus (Gastrophysus), 281.
stictonotus (Ostracion), 266.
stictonotus (Tetrodon), 281.
Stigmatophora, 189.
Sting-Ray, 478.
Stip-visch, 216.
Stoasodon, 492.
Stomias, 145.
Stomiasunculus, 145.
Stör, 342.
storeri (Aledon), 318.
stratus (Monacanthus), 231.
striatus (Balistes), 223.
striatus (Ostracion), 267.
striatus (Pneumabranchus), 14.
striatus (Squalus), 406.
strigilifer (Triacanthus), 211.
strigosus (Tetraodon), 290.
striolatus (Canthogaster), 304.
striolatus (Psilonotus), 304.
striolatus (Tetrodon), 301.

striolatus (Tropidichthys), 304.
strogylopterus (Trygon), 476.
strongyloptera (Trygon), 476.
Strophidon, 93.
Sturgeon, 342.
Sturio, 333.
sturio (Acipenser), 340, 342.
sturioides (Acipenser), 333.
subarcuata (Zygæna), 382.
subarmatus (Balistes), 218.
subcærulea (Amia), 325.
subcoronatus (Hippocampus), 205.
subnigrum (Hypnos), 453.
subosseus (Nannocampus), 178.
sucklii (Acanthias), 418.
suensonii (Chilorhinus), 52.
sufflamen (Balistes), 214.
sulcatus (Herpetoichthys), 67.
sulcatus (Monacanthus), 239.
sundaicus (Syngnathus), 155.
Sunfish, 318.
Symbranchidæ, 12.
Symbranchii, 12.
Symbranchina, 14.
Symbranchus, 15.
Sympterygia, 470.
Synaphobranchina, 22.
Synaphobranchus, 22.
Syngnathidæ, 153.
Syngnathina, 154.
Syngnathus, 155.
Syrrhina, 441.

tænia (Leptocephalus), 142, 143.
tæniatus (Anosmius), 305.
tæniatus (Tetrodon), 305.
tænioides (Leptocephalichthys), 142.
Tæniophis, 93.
tæniophora (Haliichthys), 197.
tæniophorus (Phyllopteryx), 197.
tæniopterus (Balistes), 211.
tæniopterus (Hippocampus), 202.
tæniopterus (Syngnathus), 196.
Tæniura, 483.
talabon (Conger), 45.
talabon (Muræna), 45.
talabon (Murænesox), 45.
talabonoides, 46.
Tambosil, 274.
Tangle-fish, 157.
tapeinopterus (Cirrhimuræna), 75.
tapeinopterus (Ophichthys), 75.
tapeinosoma (Syngnathus), 172.
tasmaniensis (Narcine), 452.
tasmanius (Callorhynchus), 351.
Taupe de mer, 389.
taurus (Odontaspis), 392.
Temera, 455.
temminckii (Carcharias), 374.
temminckii (Lamiopsis), 374.
temminckii (Prionodon), 374.
temminckii (Syngnathus), 165.
tenebrosa (Muræna), 119.
tentaculata (Acentronura), 516.
tentaculata (Aëtoplatea), 488.
tentaculata (Pteroplatea), 488.
tentaculatus (Crossorhinus), 414.
tentaculatus (Squalus), 432.
tenuirostris (Anguilla), 31.
tenuirostris (Syngnathus), 157, 160.
tenuis (Syngnathus), 156.
tenuis (Microphis), 156.
tenuis (Ophichthys), 88.
tepa (Tetrodon), 274.
teres (Nerophis), 193, 516.
teres (Scyphius), 193, 516.
terræ novæ (Carcharias), 360.
terræ novæ (Scoliodon), 360.
terræ novæ (Squalus), 360.
tessellata (Muræna), 106.
tessellata (Thyrsoidea), 107.
tessellatus (Gymnothorax), 107.
tesserula (Ostracion), 260, 263.
testacea (Trygonoptera), 486.
testaceus (Urolophus), 486.
testudinarius (Arothron), 296.
testudineus (Crayracion), 296.
testudineus (Tetrodon), 282, 296.
Tetrabranchus, 15.
Tetraodon, 271.
tetragonus (Ostracion), 260.
tetragonus (Syngnathus), 194.
Tetrodon, 271.
Tetrodon, Oblong, 319.
Tetrodon, Short, 317.
Tetrodontina, 270.
tetrophthalmus (Syngnathus), 169.
Tetrosomus, 255.
texana (Anguilla), 32.
Thærodontis, 93.
thalassia (Trygon), 477.
Thalassorhinus, 378.
thompsoni (Acipenser), 339, 342.
Thorn-back, 456.
thouini (Rhinobatus), 442.
Thrasher, 393.
Thyrsoidea, 93.
thyrsoidea (Muræna), 111, 113.
tiburo (Cestracion), 382.
tiburo (Sphyrna), 382.
tiburo (Squalus), 369, 382.
tiburo (Zygæna), 382.
tigrina (Gymnomuræna), 133.
tigrina (Muræna), 108.
tigrina (Murænoblenna), 114, 133.
tigrinum (Stegostoma), 409.
tigrinus (Chilomycterus), 313, 314.
tigrinus (Diodon), 314.
tigrinus (Galeocerdo), 378.
tigrinus (Ichthyophis), 133.
tigrinus (Myrichthys), 19.
tigrinus (Squalus), 409.
tile (Gymnothorax), 113.
tile (Muræna), 112, 113.
tile (Murænophis), 112.
tile (Thyrsoidea), 113.

Tilurus, 144.
timlei (Raja), 452.
timorensis (Ophichthys), 86.
tjutjot (Carcharias), 371.
Toad-fish, 285 310.
tobijei (Myliobatis), 490.
tomentosus (Balistes), 238.
tomentosus (Monacanthus), 236, 237, 238.
Torpedinidæ, 448.
torpedinus (Trygonobatus), 485.
torpedinus (Urolophus), 485.
Torpedo, 448.
torpedo (Raja), 449, 450.
Tope, 379.
Touille-bœuf, 389.
trachyderma (Monacanthus), 229.
trachylepis (Monacanthus), 248.
Trachyrhamphus, 155.
trachyrhynchus (Syngnathus), 167.
transmontanus (Acipenser), 336.
transversalis (Synbranchus), 15.
Trematopsis, 317.
Tremuelga, 449.
trepidans (Torpedo), 450.
Triacanthina, 208.
Triacanthodes, 208.
Triacanthus, 209.
Triacis, 384.
Triænodon, 383.
Triakis, 384.
Tribranchus, 28.
trichiurus (Leptocephalus), 144.
trichiurus (Tilurus), 144.
Trichocyclus, 316.
trichoderma (Tetraodon), 293.
trichodermatoides (Tetraodon), 293.
Trichodiodon, 316.
trichurus (Monacanthus), 238.
tricornis (Ostracion), 257.
tricuspidata (Murænesox), 46.
tricuspidatus (Congrus), 46.
tricuspis (Monacanthus), 229.
tridentatus (Ichthyomyzon), 506.
tridentatus (Petromyzon), 506.
triedricus (Diodon), 312.
Triglochis, 392.
trigonus (Lætophrys), 256.
trigonus (Ostracion), 256.
trimaculatus (Hippocampus), 204.
Triodon, 270.
Triodontina, 270.
triqueter (Ostracion), 256.
triserialis (Murænopsis), 58.
triserialis (Ophichthys), 58.
trispeculare (Chiloscyllium), 411.
trispeculare (Hemiscyllium, 411.
tristis (Muræna), 123.
tristœchus (Esox), 329.
tropicus (Atractosteus), 329.
tropicus (Lepidosteus), 329.
Tropidichthys, 271.
Tropidodus, 415.
trossulus (Aleuterius), 234.
trossulus (Brachaluteres), 235.
trossulus (Monacanthus), 234.
troschelii (Muræna), 118.
troschelii(Sternopygus),8.
truncata (Ranzania), 320.
truncatus(Orthagoriscus), 319.
truncatus (Tetrodon),320.
Trygon, 472.
Trygonidæ, 471.
Trygonoptera, 485, 486.
Trygonorhina, 447.
tschudii (Discopyge), 454.
tuberculata (Trygon), 480.
tuberculatum (Chiloscyllium), 412).
tuberculatus (Ostracion), 260.
tuberculatus (Squalus), 411.
tuberculatus (Synchismus), 412.
tudes (Cestracion), 382.
tudes (Sphyrna), 382.
tudes (Zygæna), 382.
tumifrons (Sternopygus), 7.
turgidus (Tetrodon), 285.
turritus (Ostracion), 258.
turritus (Tetrosomus), 259.
Tympanomium, 317.
typhle (Siphonostoma), 154, 515.
typhle (Syngnathus), 157.
typhloides (Syngnathus), 154.
typicus (Rhinodon), 396.
typus (Achirophichthys), 65.
typus (Rhinobatus), 443.
tyrannus (Anguilla), 32.

uarnacoides (Trygon), 473.
uarnak, 473.
ukpam, 480.
undecim-aculeatus(Ostracion), 264.
undulata (Muræna), 96, 110.
undulata (Murænophis), 110.
undulata (Raja), 456, 459.
undulatus (Balistes), 226.
undulatus (Lætophrys), 256.
undulatus (Rhinobatus), 444.
undulatus (Trygon), 473.
Unibranchapertura, 15.
unicolor (Ammocœtes), 500.
unicolor (Balistes), 251.
unicolor (Muræna), 96, 125.
unicolor (Murænophis), 125.
unicolor (Thyrsoidea),125.
unicornu (Balistes), 251.
unimaculata (Torpedo), 449.
uniumculatus (Balistes), 225.
unistriata (Acerana), 266.
unistriata (Capropygia), 266.
Uranichthys, 54.
Uraptera, 455.
Urocampus, 179.
Uroconger, 43.
Urogymnus, 471.
Urolophus, 485.
urolophus (Conger), 73.
urolophus (Ophichthys), 73.
uropterus (Conger), 50.
uropterus (Myrus), 50.
uropterus(Ophisurus),50.
Uropterygius, 133.

ursini (Ozodura), 318.
uyatus, 419.

vacca (Squalus), 397.
vachellii (Balistes), 213.
valenciennii (Chœroichthys), 187.
valenciennii (Doryichthys), 187.
valenciennii (Muræna), 110.
valenciennii (Pteroplatea), 486.
valentini (Anosmius), 305.
valentini (Canthogaster), 305.
valentini (Ostracion), 265.
valentini (Psilonotus), 305.
valentini (Tetrodon), 305.
valentini (Tropidichthys), 305.
vampyrus (Ceratoptera), 498.
variabilis (Aleuterius), 246.
variegata (Anguilla), 27.
variegata (Echidna), 130.
variegata (Muræna), 116, 130.
variegata (Murænophis), 103.
variegata (Pœcilophis), 130.
variegatum (Scyllium), 406.
variegatus (Syngnathus), 157, 515.
variegatus (Trygon), 473.
variolatum (Hemiscyllium), 410.
variolatum (Parascyllium), 410.
variolosus (Holocanthus), 295.
varius (Monacanthus), 239.
varius (Orthagoriscus), 320.
Velasia, 508.
velutinus (Aluteres), 244.
venosa (Muræna), 118.
venosus (Aluterus), 252.
vermicularis (Gastrophysus), 280.
vermicularis (Muræna), 118.
vermicularis (Tetrodon), 280.
vermiculata (Muræna), 113.
vermiformis (Chilorhinus), 53.
vermiformis (Murænichthys), 53.
verreauxii (Conger), 39.
verrucosus (Balistapus), 225.
verrucosus (Balistes), 218, 225.
verrucosus (Diodon), 310.
versicolor (Elapsopsis), 68.
versicolor (Ophichthys), 68.
versicolor (Ophisurus), 68.
verus (Acipenser), 342.
verus (Carcharias), 392.
verus (Conger), 39.
vespertilio (Holorhinus), 489.
vespertilio (Myliobatis), 490.
vespertilio (Rhinoptera), 489.
vetula (Balistes), 215.
vicina (Muræna), 121.
vicina (Murænophis), 121.
vidua (Balistes), 216.
vidua (Melichthys), 217.
villosus (Monacanthus), 241.
vimineus (Ophisurus), 54.
vimineus (Sphagebranchus), 54.
vimineus (Stethopterus), 54.
violacea (Trygon), 477.
violaceus (Scyphius), 190.
virescens (Anguilla), 35.
virescens (Muræna), 35.
virescens (Sternarchus), 7.
virescens (Sternopygus), 7.
virgata (Raja), 461.
virgata (Tetrodon), 291.
viridescens (Balistes), 220.
viridescens (Pseudobalistes), 220.
viridescens (Syngnathus), 157.
viridipunctatus (Leiodon), 289.
viridipunctatus (Tetrodon), 289.
viridis (Amia), 325.
viridis (Balistes), 225, 226.
viridis (Esox), 329.
viridis (Lepidosteus), 329.
viridis (Syngnathus), 154.
vittata (Channomuræna), 134.
vittata (Gymnomuræna), 134.
vittata (Nettastoma), 134.
vittatus (Corythoichthys), 155.
vittatus (Monacanthus), 244.
vittatus (Ichthyophis), 134.
vittatus (Sarchirus), 330.
vittatus (Squalus), 405.
vittatus (Synbranchus), 16.
Vivelle, 438.
volans (Pegasus), 147, 148.
vomer (Raja), 468.
vulgaris (Acanthias), 418.
vulgaris (Anguilla), 28, 31.
vulgaris (Conger), 38, 39.
vulgaris (Galeus), 379.
vulgaris (Mustelus), 385, 386.
vulgaris (Myrus), 50.
vulgaris (Squatina), 430.
vulgaris (Torpedo), 450.
vulgaris (Trygon), 478.
Vulpecula, 393, 417.
vulpecula (Thalassorhinus), 378.
vulpes (Alopecias), 393, 518.
vulpes (Alopias), 394.
vulpes (Carcharias), 393, 518.
vulpes (Squalus), 393.
vultur (Myliobatis), 491.

waandersii (Leiodon), 289.
waandersii (Tetrodon), 289.
wabashensis (Anguilla), 29.
Walawah Tenkee, 441.
walbeehmii (Carcharias), 359.
walbeehmi (Scoliodon), 359.
waiga (Trygon), 475.
walshii (Torpedo), 449.
westphali (Tæniophis), 123.
Whip-Ray, 489.
willughbei (Trematopsis), 318.
willughbeii (Balistes), 214.
wilsoni (Gymnothorax), 93.

xanthognatha (Ophicardia), 15.
xanthognathus (Monopterus), 14.

xanthognathus (Synbranchus), 14.
xanthopterus (Gastrophysus), 279.
xanthopterus (Gymnomuræna), 134.
xanthopterus(Tetraodon), 279.
xanthopterus(Uropterygius), 133.
xanthospila (Muræna), 131.
xanthospilus (Echidna), 131.
Xenodon, 212.
Xenopterus, 270.

Yahla, 439.
yalei (Lactophrys), 256.
yalei (Ostracion), 256.
yarrelli (Acipenser), 342.
yarrelli (Leptocephalus), 142.

zambezensis (Belonichthys), 181.
zambezensis (Carcharias), 363.
zambezensis (Prionodon), 363.
zambezensis (Syngnathus, 181.
zanzibarensis (Syngnathus), 168.
zebra (Cestracion), 415.
zebra (Echidna), 129.
zebra (Gymnomuræna), 128.
zebra(Gymnothorax),129.
zebra(Heterodontus),415.
zebra (Muræna), 96, 128.
Zebra-Shark, 409.
Zee Duyvel, 498.
Zee-vleermuis, 491.
zonura (Pteroplatea),488.
zonurus (Aëtoplatea),488.
zugei (Trygon), 481.
Zygæna, 380.
zygæna (Cestracion), 381.
zygæna (Squalus), 381.
Zygænina, 380.
zysron (Pristis), 436, 438.

END OF THE EIGHTH VOLUME.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.